

## A Proposal: Mitigating Effects of the Economic Crisis With Career ePortfolios

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Contemporary labor markets are suffering from the recession and structural shifts, which can cause various mismatches through processes of search friction. A lack of informational transparency among worker- and job characteristics is the common denominator of these search frictions. In this paper, the potential of the career ePortfolio, which consists of information beyond what is typically found in a jobseeker's resume, in reducing these mismatches and search frictions is explored. The career ePortfolio, it is argued, leads to better worker-to-job matches, increased worker mobility, and reduced unemployment levels and transaction costs. By exploring mismatches and search frictions theoretically, the required features of such a career ePortfolio were identified. A multi-disciplinary approach was used, drawing from literature on labor market economics as well as human resource management. It was concluded that the career ePortfolio should consist of competence-based information on both the aggregate and individual levels in order to facilitate workers and firms in their career and personnel planning and help government and educational institutes devise appropriate labor market policies and curricula. Major challenges include the required shared understanding of competences among workers and firms, given their heterogeneity, as well as the need for credible information, given the asymmetrical nature of labor market information.

In the past few years, labor markets have been affected by severe economic turmoil, which has impacted the labor force and economic activity all over the world. In the EU, many member states have suffered from low job-finding rates, rising unemployment rates, and longer spells of unemployment (European Commission, 2012; van der Ende, van Heel, Walsh, de Wit, & Ziminiene, 2012). In the US, it has been reported that more than half of all adults in the labor force reported a spell of unemployment, a cut in pay, a reduction in hours, or an involuntary shift to part-time work since the last recession, which commenced in 2007 (Pew Research Center, 2010). Currently, economic expansion can be observed; however, unemployment levels remain relatively stable (International Labor Organization, 2013). Many organizations are still experiencing great difficulty in filling key positions in certain sectors of the economy (Bureau of Labor Statistics, 2013; European Commission, 2012; van der Ende et al., 2012; West, 2013). Many unemployed jobseekers pursue employment in sectors different from those in which ample vacancies exist, which is theorized to be one of the main causes of the low job-finding rates around the globe (Sahin, Song, Topa, & Violante, 2012). Furthermore, there are three emerging structural shifts to consider: the globalization of labor markets and consequent economic migration; industrialized economies becoming progressively knowledge-based; and the aging of working populations (Organization for Economic Co-Operation and Development, 2011a, 2011b).

These issues have also been identified by the Organization for Economic Co-Operation and Development (OECD) and the European Commission,

which resulted in the OECD Skills Strategy and the EU Agenda for new skills and jobs, as part of the Europe 2020 strategy (European Commission, 2013; OECD, 2012). Both agendas are based on the notion that the matching of workers to jobs can improve with a better coordination between recruitment strategies employed by firms, public employment services, and private labor market intermediaries. In addition, the changing demands for skills have to be translated into up-to-date educational curricula. One of the main requirements for achieving this is distributing richer information about the particular skills that employers demand and how they contrast with the skills possessed by workers (European Centre for the Development of Vocational Training [CEDEFOP], 2012).

Currently, the role of job-matching is fulfilled by labor market intermediaries, such as online job boards and recruitment agencies, who involve themselves in the matching of workers to jobs (Autor, 2013). In this paper, the potential of competence-based career ePortfolio systems will be explored theoretically by drawing from literature on labor market economics and human resource management. This is relevant to the relatively new portfolio literature, which typically revolves around the educational context from a pedagogical perspective. The research question of this paper reads as follows: "What is the promise of the career ePortfolio, given the manifestations of mismatches and search frictions in the labor market?"

The paper is structured as follows. First, the career ePortfolio concept and its potential role in the job matching process will be described. Then, existing labor market problems will be analyzed on a macro-economic level by looking at cyclical and structural economic developments. On this basis, the required

scope of the career ePortfolio concept will be established. Then, underlying mismatches will be identified, and the implications for the career ePortfolio will be discussed. Subsequently, these mismatches will be analyzed using theories about search frictions in the labor market. Search frictions are problems arising from the heterogeneous nature of workers and jobs, which can hinder the matching process (Mortensen, 2010). Based on the characteristics of these mismatches and the common denominator of search frictions—the presence of imperfect information—the potential role of the career ePortfolio will be discussed by identifying its required features.

### **Job Search and Career ePortfolios**

Due to the growing prevalence of job-searching via the Internet, information about jobs and workers can be widely spread, increasing the scope of search for both workers and firms at a lower cost. In theory, this has a positive effect on match quality, raising the productivity level of a match, worker earnings, and firm profits (Autor, 2001). Additional benefits include lower unemployment levels, reduced transaction costs of matching, and an enhanced mobility of workers, who can more easily engage in an on-the-job search (Autor, 2001; Freeman, 2002). These benefits are expected to be achieved by the provision of richer market information through career ePortfolios, which has previously been operationalized as organized evidence of work readiness and specific job skills which can be focused to show the skills that employers want (Smith, 1996). Smith (1996) and Woodbury, Addams, and Neal (2009) added that the career ePortfolio consists of a resume, plus evidence of abilities, knowledge, skills, and potential in order to build credibility. The evidence consists of artifacts that demonstrate competence, including assessment results, research papers, certificates, or reports on projects, teamwork, or internships (Amarian & Flanigan, 2006).

The concept of a “career ePortfolio” is derived from the ambiguous concept of “ePortfolio” (i.e., electronic portfolio), which is considered to be the overarching concept in its relatively new field of literature. There is a lack of consensus about what exactly constitutes an ePortfolio (Batson, 2013; Grant, 2005). Several different ePortfolio definitions have been identified, contributing to the conceptual confusion. Definitions range from considering the ePortfolio as a collection of artifacts for a certain purpose (IMS Global Learning Consortium, 2005), to describing it as an information management system that uses electronic media and services (Haywood et al., 2007), or a combination of the two (Challis, 2005). For the most part, the literature revolves around the use of ePortfolios in education for learning purposes. This can be explained by the fact that the concept originally arose in this setting with

the use of paper-based portfolios. It was defined as a selection of student’s work for learning and assessment purposes, emphasizing the importance of aspects such as self-reflection and the student’s ownership of the learning process (Paulson, Paulson, & Meyer, 1991). The electronic portfolio became a topic of growing scientific interest in the early 2000s; nevertheless, the literature remained predominantly rooted in the educational context. In the contemporary literature, ePortfolios are typically characterized as having three distinct purposes: facilitating the learning process; demonstrating learning outcomes through assessment; and showcasing learning outcomes to others (National Learning Infrastructure Initiative, 2003; Balaban, Divjak, & Kopic, 2010; Greenberg, 2004; IMS Global Learning Consortium, 2005). There is a consensus among scholars and practitioners that the concept is useful for career purposes, such as professional development, career planning, and job seeking (Amarian & Flanigan, 2006; Balaban, Divjak, & Mu, 2011; Cambridge, 2010; Greenberg, 2004; Jafari & Greenberg, 2003; JISC, 2007; Tosh & Werdmuller, 2004).

The job-matching process is contingent on the availability of representative and reliable information about the demand and supply sides of labor (Isgin & Sopher, 2013; Mortensen, 2010). The career ePortfolio can be utilized to provide this as part of the online job search, which has become a significant component of the job-searching process over the past years. Kuhn and Mansour (2011) found that an Internet job search reduces individual workers’ unemployment durations by 25%. They replicated Kuhn and Skuterud’s (2004) study, in which it was found that unemployed workers who utilized an Internet search in fact endured longer unemployment durations compared to their offline searching counterparts. One explanation provided at the time was that the online job search is an inferior job-searching tool. The 2011 replication had a different outcome, proposing that the reduced unemployment durations that they found can be attributed to a significant uptake in Internet use and connectivity, consequent new low-cost channels of interaction between job seekers and firms, and an overall improved design of Internet job search sites, such as LinkedIn and Monsterboard (Kuhn & Mansour, 2011). However, despite these improvements, it can be argued that given the labor market problems of today, the need to enhance the job-matching process is still present.

### **Cyclical and Structural Developments and Career ePortfolios**

Labor market problems can result from either cyclical economic problems or structural shifts. In order to explain the role of these two phenomena, one can start by looking at the behavior of a labor market over time. Macroeconomists use the Beveridge curve for this

purpose (see Figure 1). The Beveridge Curve, named after economist William Beveridge, is a graphical depiction of the relationship between a labor market's vacancy rate and the unemployment rate. The behavior of the curve represents the state of the economy and can be helpful in determining if there are cyclical economic problems or structural ones. On the vertical axis, the job openings rate measures the number of unfilled jobs in a labor market, whereas on the horizontal axis, the unemployment rate represents the number of unemployed job seekers. Generally, in times of cyclical economic decline the unemployment rate is high, whereas the job vacancy rate is low. This can be recognized by a downward sloping movement of the Beveridge curve towards the lower-right. In the case of structural changes, the curve is likely to shift out or inwards, indicating the changing degree of efficiency at which a labor market operates (Daly, Hobijn, Şahin, & Valletta, 2012; Mortensen, 1994). For example, an outward shift indicates higher levels of job openings for a given level of unemployment, indicating increased difficulty in matching job openings to unemployed workers.

As can be inferred from Figure 1, the US economy suffered from a major economic contraction between December 2007 and June 2009, as illustrated by the decline in job openings and an increase in the unemployment rate. After 2009, the curve shifts outwards and shows a disproportionate increase in the number of vacancies relative to the unemployment rate. This suggests a less efficient matching of workers to jobs (Federal Reserve Bank of Chicago, 2012). This shift outwards is also observed in many OECD countries, especially in the United Kingdom and Sweden. There are several possible explanations for the shift.

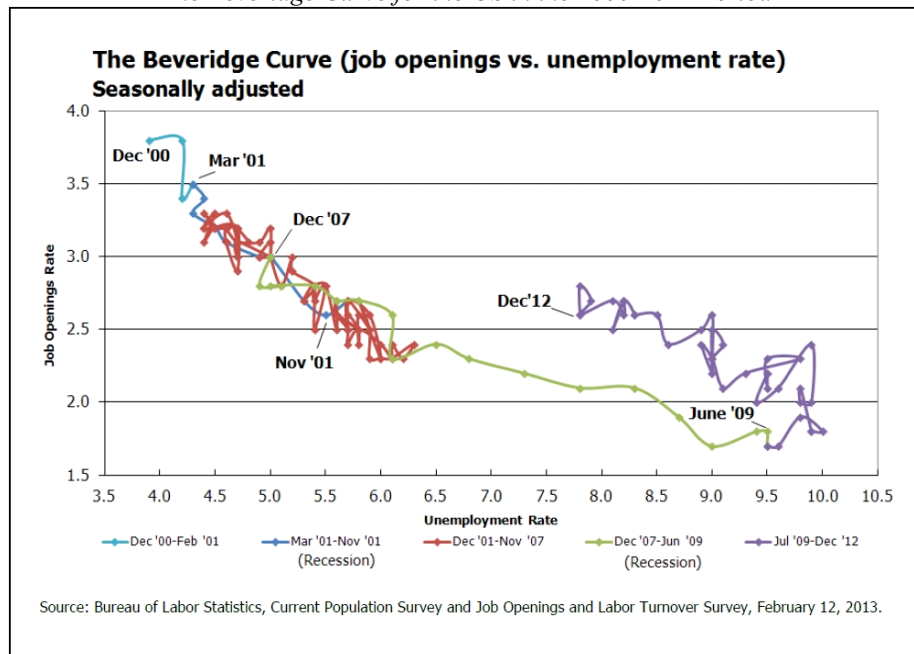
First, it is possible that the shift is the result of cyclical economic behavior and therefore expected to be of a temporary, frictional nature. Unemployment rates are known to respond more slowly than vacancies to economic shocks, due to job matches not being instantaneous (Mortensen, 2010). Another contributing factor may be that given the economic uncertainty, firms' recruiting intensity declined (Barnichon, Elsby, Hobijn, & Şahin, 2012). Employers are also known to be more selective in times of a recession; given the large number of jobseekers, they keep searching for a better alternative (Capelli, 2011). At times, this results in over-inflated selection criteria (Zimmer, 2012). Conversely, the search intensity of the unemployed may also have declined, due to extensions of unemployment benefits or discouragement (OECD, 2011a, 2011b). Second, it is possible that the shift reflects a structural rather than a cyclical change, since there are increasing levels of both unemployment and vacancies (Shiferaw & Robertson, 2010). Furthermore, when comparing the

current behavior of the Beveridge curve to the previous post-recessionary period, no previous significant outward shift can be observed (Bureau of Labor Statistics, 2011). Therefore, it can be argued that the shift is indicative of a worsening structural mismatch between certain characteristics of jobseekers and job vacancies. Third, it is possible that the behavior of the Beveridge curve reflects a shift from a cyclical to a structural change (DeLong, 2010) or a combination of both cyclical and structural changes (Bureau of Labor Statistics, 2011; Diamond, 2013; Shimer, 2005). The latter is suggested in a recent analysis of the US labor market, which revealed patterns indicating a strong cyclical and a relatively small structural effect on the unemployment rate (Levine, 2013). In a different recent study, it was proposed that out of all OECD countries, the US was the least vulnerable to an increase in structural unemployment (Guichard & Rusticelli, 2010).

With regards to cyclical changes, the career ePortfolio could prove to be valuable in the matching of workers during times of fluctuating demands for labor. When information about worker and job characteristics in a certain labor market (e.g., in a certain region) is transparent, this enables the reallocation of workers by helping them to find suitable work at various organizations whose demands for labor can be affected differently (Bonin et al., 2008). Furthermore, the career ePortfolio could be a viable concept in light of careers becoming increasingly boundaryless, with more complex and multifaceted career progression across boundaries of organizations, sectors, and regions (DeFillippi & Arthur, 1996; Gunz, Evans, & Jalland, 2000). To help facilitate this in Europe, the Europass initiative has been introduced to enable citizens to communicate their skills and qualifications in a uniform manner across European borders. Europass consists of several standardized documents, among which are a curriculum vitae, a language passport, and various documents issued by educational and training authorities. These documents include information about an individual's skills and knowledge that is recognized across the continent. However, the information included is relatively broad and generic, as a standardized common skills and competence model is still under development (Open Education Europe, 2010). Currently, the European Commission is coordinating the development of European Skills, Competences, and Occupations (ESCO), which is a European classification of jobs and skills that can be utilized to complement the Europass initiative.

In the case of structural changes—for example, when new technologies emerge that may lead to the obsolescence of certain skills—workers whose skills no longer match those required of them find themselves in a precarious situation. This situation can be prevented

Figure 1  
*The Beveridge Curve for the US in the 2000-2012 Period*



by workers investing in their employability, maintaining a varied and transferable competence package that can facilitate necessary transitions to employment in other environments (van der Heijde & van der Heijden, 2005). Cyclical and structural developments are both associated strongly with mismatches on the labor market, with various manifestations.

### Labor Market Mismatches and the Career ePortfolio

In economic terms, a mismatch on the labor market is an imbalance between the supply of and demand for human capital. The concept of mismatch arose in the 1980s, when economists attempted to clarify the sustained rising levels of unemployment in Europe (Sahin et al., 2010).

There are several types of mismatches. First, a quantitative mismatch indicates that there are fewer workers available than jobs, or vice versa. It is anticipated, for example, that many OECD countries will deal with labor shortages in the future as a result of the aging working population (Gautier & Teulings, 2011). Second, there can be a geographical or regional mismatch resulting from a geographic dispersion of jobs and suitable workers. For instance, in the Brainport area in the Netherlands, due to regional shortages many high-tech organizations are being forced to recruit suitable workers internationally (NRC, 2013). Third,

there can be a mismatch of preferences among workers and types of jobs available. This occurs when certain characteristics of available jobs do not correspond to the preferences of the job seeker. For example, a worker may be unwilling to accept a certain job when he deems the remuneration, working conditions, or status it provides to be insufficient (Boswell, Stiller, & Straubhaar, 2004).

Mismatches can be categorized either as long-run aggregate qualitative mismatches or as short-run qualitative or quantitative mismatches (Sattinger, 2012). Long-run aggregate qualitative mismatches follow from structural changes in the economy that alter the mix of job and worker characteristics. Such changes include technological change, globalization, capital investments, and changing educational policies. Mismatches on this level, it is argued, lead to job polarization, inequality, and restricted firm expansion and economic growth (Sattinger, 2012).

Short-run qualitative and quantitative mismatches are the result of two fundamental labor market features that lead to mismatches, namely that great variety exists among both jobs and workers, and that search frictions prevent firms and workers from being fully informed about each other. These mismatches often occur upon entry into the labor market, causing workers to change jobs frequently, deal with spells of unemployment, and accept positions for which they are over- or underqualified (Sattinger, 2012; Wolbers, 2003). For firms, evidence was found that firm productivity is

positively related to the proportion of overqualified workers, and negatively related to the underqualified (Kampelmann & Rycx, 2012). For the economy as a whole, as research by Gautier and Teulings (2011) has shown, mismatches cause a 5% to 10% loss in output for the economy, following from idle sources like the unemployed, spending resources on recruitment activities, and the sub-optimal assignment of workers to jobs.

While this might be a feasible investment for international organizations such as Philips and ASML, companies with a smaller scope of business might not possess the resources or the desire to recruit personnel internationally. Therefore, other than a career ePortfolio for the jobseeker, there should also be a portfolio of the firm at which a worker applies. For example, the online job search engine Glassdoor offers prospective workers with information provided by current or past employees of a company in order to help workers make informed decisions. The information provided relates to remuneration, company reviews, and experiences with the recruitment process. Another website, WikiJob, provides insight into the graduate recruitment process and working life of several companies in the United Kingdom. Job seekers, graduates, students, and employers can all contribute information to this independent website. This information can help individuals to make informed decisions about the compatibility of the job with their work values, which is known to affect job choice decisions (Judge & Bretz, 1991).

It is important to note that being well matched with respect to qualifications does not rule out the possibility of being mismatched with respect to skills. A horizontal mismatch is estimated to occur in one out of every five jobs and occurs when the type of qualifications or skills does not correspond with those required for the job (Sattinger, 2012). The career ePortfolio can be utilized here to enhance a worker's employability. This can be achieved by facilitating the identification of prior learning, the development, demonstration, and presentation of competences through processes of formal, informal, and non-formal learning over the course of a lifetime (lifelong learning). Formal learning occurs within an organized and structured context such as educational settings and in-company training; non-formal learning consists of learning embedded in activities that are not designated as for learning such as on-the-job learning; and informal learning is defined as learning resulting from daily life activities such as work or leisure (Bjornavold, 2000). The learning outcomes can be formalized and validated through assessments and competence tests that can then be used for matching purposes. The mismatches described above result partly from cyclical and structural developments and partly from manifestations of heterogeneity among

workers and jobs. The latter feature of the labor market is largely responsible for the state of contemporary labor markets, as it elicits search frictions that hinder the effective allocation of workers to jobs. These search frictions will be further detailed below in order to further develop the criteria for a career ePortfolio.

### **Search Frictions and the Career ePortfolio**

In the process of matching, search frictions arise due to imperfect information about mostly heterogeneous workers and jobs and a lack of coordination. The key implication is that due to the presence of search frictions, the labor market fails to clear structurally, and unemployed workers coexist together with unfilled vacancies. The work of Nobel laureates Diamond, Mortensen, and Pissarides is considered to be among the most significant contributions to the standard theory of equilibrium unemployment, which recognizes that labor market trade is a costly and time-consuming process. Their theoretical contributions can be applied to other contexts as well, such as the housing and even the marriage market. These markets have in common that agents spend time and resources to meet, typically strive for long-term relationships, and compete with one another. In these markets, a house, partner, or job is deemed of acceptable quality when its expected future value exceeds the expected value of a continued search for a better alternative (Mortensen, Pissarides, Tatsiramos, & Zimmerman, 2011).

Search frictions result in two distinct phenomena that contribute to mismatches: costly job search and adverse selection.

### **Costly Job Search**

In the labor market, jobs differ with respect to terms, location, remuneration, career development prospects, and skills required of the worker, as well as other characteristics. Among workers, there is great variation in their skillsets, preferences, and other relevant attributes. This makes it difficult for workers and firms to make informed decisions (Mortensen et al., 2011). Because information is costly, workers and firms have to invest in resources in pursuit of a productive match (Katz & Stark, 1987; Mortensen et al., 2011). The costs for workers are related to collecting information and applying for jobs. In turn, firms invest in recruitment and selection activities, such as posting job vacancies and conducting assessments. Both parties are hereby aided by online job boards, which have the potential to reduce search frictions by the distribution of labor market information at a lower cost than workers and firms could obtain for themselves. However, job vacancies typically lack adequate descriptions of the

skill attributes or competences required by firms, making it difficult for jobseekers to demonstrate their suitability (Bennett, 2002). Furthermore, due to the conceptual fragmentation of the term “competence,” in contemporary recruitment practices competences are typically approximated based on one’s qualifications. This is problematic, as empirical evidence has shown that a match between qualifications and job requirements is an insufficient condition for a good skills match (Quintini, 2011). In addition, qualifications imply the presence of competences, often without making these explicit (Barker, 2003). Furthermore, this approach is time-bounded, without consideration of continued (or life-long) learning through experience and on-the-job learning (Sattinger, 2012; Winterton, 2009).

In “Wiring the Labor Market” (2001), Autor introduced the useful distinction between “low bandwidth” and “high bandwidth” information relating to a worker’s attributes. The former refers to such data as education, credentials, working history, and salaries, which are considered to be objectively verifiable and available in abundance through the Internet. The latter category involves features such as quality, motivation, and “fit,” which he deems of crucial importance for a match and relatively hard to verify without direct interactions and interviews. Autor suggested that by transforming the operation of labor markets through standardization, matches can improve and adverse selection be reduced. This can be achieved by developing detailed, verifiable, and uniform skill certificates, on which basis matches are formed. However, given the heterogeneity among workers and jobs, it is questionable whether this is a realistic solution. The proposed alternative is to facilitate more detailed information disclosure through electronic resumes, which “may ultimately provide—in addition to credentials and experience—project portfolios, dockets of customer evaluations, and even standardized personality assessments” (Autor, 2001, p. 36).

The implication for the career ePortfolio is that it should be part of a transparent information system that includes individual and aggregate information about the competences of workers, which can be offset against those of firms in certain sectors and regions. This can facilitate the strategic personnel planning of firms and foster the ability of individuals to anticipate and react more adequately to the effects of job creation and destruction. Furthermore, this information can aid educational institutes and the government in the development of appropriate curricula and labor market policies.

Because of its various interpretations in the literature, “competence” is a concept surrounded by ambiguity and confusion. The term is used in a variety of models and approaches, complicating practical

applications of the concept (Weinert, 1999; Winterton, 2009). With respect to job matching, competencies can be used by firms as the basis for establishing requirements for effective performance in a job (Hoge, Tondora, & Marrelli, 2005; Sattinger, 2012). Following an extensive literature review, Winterton, Delamare-Le Deist, and Stringfellow (2005) proposed a typology consisting of cognitive, functional, social, and meta-competences. The first three are in line with the influential Bloom’s taxonomy (Bloom, Mesia, & Krathwohl, 1964) and, respectively, represent knowledge, physical skills, and attitudinal competences. Meta-competences were also included to represent the degree to which individuals can learn, adapt, anticipate, and create. These are related to processes of learning and reflection that are critical to the development of new mental models in various jobs (Briscoe & Hall, 1999; Brown, 1993; Kolb, Lublin, Spoth, & Baker, 1986). Competence utilization and development are dependent on the context in which they take place (Hodkinson & Issitt, 1995). Abstract, narrow descriptions of competence fail to represent adequately their complex nature in a working context (Attewell, 1990).

Competences can be divided into the vocational (field-specific) and generic categories. This distinction is important, as vocational competences are known to influence positively the chance of being matched inside a jobseeker’s occupational domain, whereas generic competences increase the likelihood of being matched outside of one’s domain, stimulating inter-sectoral mobility (Heijke et al., 2003).

Matching on competences can be facilitated by career ePortfolios by including information about available competences of graduates, the employed, and the unemployed, as well as information about competences required by organizations, provided that both the workers and firms have a shared understanding of the competences involved. This is contingent on these parties using the same terminology, which is a challenge of considerable proportion, given the intrinsic heterogeneity of workers and jobs (Autor, 2001). There is a top-down development in Europe to stimulate this with the EQF (European Qualifications Framework), although at the time of writing, this initiative suffers from the lack of a conceptually sound framework (Winterton, 2009). Apart from working towards a shared understanding of competences, it is crucial that this information be communicated effectively between ICT tools and services (e.g., different career ePortfolio systems). Several technical standards and information models have been developed to facilitate this interoperability, among them the NTA-2035 ePortfolio standard in the Netherlands, the international Leap2A ePortfolio standard, and the European funded InLOC project, which was conducted to enable the

representation of learning outcomes and competences across different career ePortfolio systems.

Blings and Spöttl (2008) proposed that a bottom-up approach, developing the framework through empirical analysis on the sector and occupational levels, is more feasible. The US-based Occupational Information Network (O\*NET) system resembles this approach. It includes almost 250 measures of skills, abilities, work activities, training, work context, and job characteristics for approximately 900 different occupations in the US. Striving for current labor market data, the information is retrieved periodically from workers through survey questionnaires (United States Department of Labor, 2013). In addition, there are developments in the field of semantic matching, which entails the automated matching of competences by identifying similarities in their underlying meaning (Fazel-Zarandi & Fox, 2009). Given the wide variety of contexts in which competence development can take place, credibility is also an important consideration (Barker, 2003). This can be countered by the implementation of certain validation mechanisms, such as rubrics and feedback.

### **Adverse Selection**

The presence of costly and asymmetric information inhibits an externality of adverse selection. Following the principles of Akerlof's (1970) classic Market for Lemons model, both workers and firms possess private information that might be of interest to each other and to other trading partners. For workers, the information can be related to the amount of training the worker has received and/or the worker's abilities (Chang & Wang, 1996; Katz & Ziderman, 1990). This harms the value of the worker to other firms, as the value of a worker is contingent on this type of information (Katz & Ziderman, 1990). Jobseekers need to signal their suitability for a job, while firms need to utilize various technologies to screen these candidates (Jovanovic, 1984).

Adverse selection is likely to arise because jobseekers may apply for jobs whose skill requirements they cannot meet. The risk of adverse selection is reinforced by the growth of Internet job searching, which lowers the barriers to applying for jobs. A natural consequence is that more workers will apply for more jobs (Autor, 2001). This lowers the average quality of the applicant pool and increases both the cost of selection and likelihood of mismatch (CEDEFOP, 2012). Adverse selection can also occur through opportunist behavior among workers and firms. Both parties can choose to conceal information or provide false information to the other party in an attempt to maximize the return from the match. Workers can, for example, misrepresent their skill and productivity levels during a job application. As a consequence, the

equilibrium return to jobseekers' skill investments is reduced (Akerlof, 1970; Kuhn & Skuterud, 2004).

Adverse selection can be mitigated by facilitating and, either implicitly or explicitly, compelling workers and firms to disclose information through career ePortfolios that they would rather keep to themselves. An example for workers is the job search engine AlmaLaurea, set up in 1994 by a consortium of Italian universities, which revealed detailed administrative records for its students in the database, including information such as grades and rank in class. This made it possible for potential employers to screen the candidates based on credible information. As a consequence, the ability of lower performing students to misrepresent themselves was reduced. Furthermore, because firms can ascertain easily which students are high-performing, excelling students needed to put less effort into signaling their abilities. An empirical analysis has resulted in compelling evidence that this site has reduced the unemployment rate of the participating graduates. The career ePortfolio could work in a similar manner by adding information about the students' competences. While this system raises concerns about whether only successful students will grant permission to be included in the system, it could be argued that less successful students are implicitly compelled to do the same, as their absence from the database might cause employers to make unfavorable inferences about their competences.

For firms, the job search engine Glassdoor provides prospective workers with information provided by current or past employees about a company to help them in screening a job, preventing a potential mismatch of preferences. The information includes salaries, company reviews, and experiences with the recruitment process. However, because the information provided by (former) workers is not necessarily credible and may be biased (and even inhibit an externality of adverse selection, in case the reviewers are predominantly unsatisfied), the need for organizations to signal company and job characteristics remains. If an organization were to disclose this information voluntarily, in addition to detailed information about the competences they require from workers, qualitative and preferential matches could be avoided.

### **Conclusion**

The career ePortfolio can prove to be a valuable instrument for matching workers to jobs, a process that is becoming increasingly dependent on information and communication technology in online job searches. Despite its advancements, the need to gather relevant information about workers and jobs is still present. By facilitating a more detailed and systematic disclosure of

information relevant to a match, the career ePortfolio may boost the quality of matches and the mobility of workers, and it holds the potential to decrease unemployment levels and the transaction costs related to a match.

By looking at recent labor market statistics, it can be inferred that many labor markets are affected by structural shifts and cyclical recessionary effects. The career ePortfolio can enable workers to maintain their employability levels by developing a varied and transferable set of competences, in order to be less threatened by competence obsolescence. Furthermore, the career ePortfolio can facilitate the reallocation of workers across the boundaries of affected organizations, sectors, and regions.

Given the various manifestations of mismatches in the labor market, the career ePortfolio needs to go beyond profiling individual jobs or workers. It should be part of an information system that contains information on both the aggregate and individual level. Workers need to be able to establish where suitable jobs are located, and in what quantity. Conversely, for personnel planning purposes, organizations need to be informed about the degree of availability of suitable workers. The information in this system can also help educational and governmental institutes develop appropriate curricula design and labor market policies.

Due to the nature of search frictions, the career ePortfolio should contain information about the competences possessed by workers, as well as those required in jobs by firms. A major challenge here relates to the required mutual understanding about competences by firms and workers. Given the heterogeneity among workers and firms, it is hard to align their terminology and understanding of the ambiguous term. Other challenges follow from the need for credible information, in order to prevent workers and firms from misrepresenting themselves.

While the potential utility of the career ePortfolio is evident first and foremost from a theoretical perspective, there is a need for empirical support to further investigate its practical merits. As part of a government-support project in the Netherlands, between 2012 and 2015 the above mentioned theoretical promise of the career ePortfolio, as well as related challenges, were empirically researched. The most challenging issues are as follows: compatibility of different competence languages; implications for HRM departments in organizations; support for individuals in building a career ePortfolio; ownership of data, security, and privacy; individual and organizational perceptions; and credibility and validity of information.

### **Compatibility of Different Competence Languages**

Exchanging information about competences between workers and firms requires a shared understanding of its meaning. Therefore it is of crucial

importance to explore the possibilities for this. In the research project, experiments are conducted with the creation of a universal competence framework, as well as with semantic-based competence matching.

### **Implications for HRM Departments in Organizations**

Organizations typically utilize organization-specific instruments as part of their personnel management—for example, through assessments in cycles of appraisal. Because the career ePortfolio requires the transferring of information stored in these systems, the extent to which career ePortfolios can be integrated with these systems needs to be established.

### **Support for Individuals in Building a Career ePortfolio**

There are substantial differences in digital literacy among the working population. Furthermore, competence assessments are often costly. Support and guidance therefore are required to help facilitate the recognition of competences on a large scale.

### **Ownership of Data, Security, and Privacy**

Information about an individual's competence is often made explicit in organizational or education-specific processes, such as assessments. This raises questions about who owns the data: the individual or the organization that provides the tools for assessment. Furthermore, concerns of privacy and data security are the subject of global public debate. In 2012, social networking site LinkedIn suffered a hack that resulted in over six million accounts being compromised. Given the sensitivity of information that can be stored in a career ePortfolio system, the safety of this information needs to be ensured. The European Commission funds several projects in which experiments are conducted to ensure a reliable distribution of personal data. One such project is TAS3, in which the aim was to give the individual full control of his or her personal data within a trusted services network. An infrastructure was developed in which compliance with data protection was preserved (Centre for International ePortfolio Development, 2012). Follow-up projects are being undertaken at the time of writing this article (ABC4Trust, 2014).

### **Individual and Organizational Perceptions**

Career ePortfolio use is contingent on the perceptions and attitudes of workers and firms. Anecdotal evidence from the project shows that organizations are wary of facilitating career ePortfolios, fearing that they will lose their best personnel to competing organizations. Furthermore, individuals fear that the information collected for the career ePortfolio



can be used to their detriment, for example in reorganizations. These concerns need to be explored further systematically.

### Credibility and Validity of Information

Competences can be developed in various settings that are not always supported by assessment tools, especially in non-formal and informal learning settings. Therefore, it is a major challenge to ensure that claims made about competences are credible and valid.

Given the variety of these challenges, answers will be sought through a multi-disciplinary research approach and through examining relevant international practices and developments.

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