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ePortfolios in the Workplace for Human Capital Management: A Multiple Case Study

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This study researches whether the ePortfolio is a suitable instrument for human capital management in the business environment. The implementation of ePortfolio systems in five different organizations is analyzed. It considers whether ePortfolio implementations were successful, and relevant critical success factors were identified. For the latter purpose, a theoretical framework for analysis was compiled from the literature. The results show that the ePortfolio proved to be a useful tool for HCM purposes in two cases. The ePortfolio enabled these organizations to enhance their talent management and performance appraisal practices. Three out of five cases failed, reaching a bare minimum of their company goals and objectives. To explain these findings, the implementation processes in each of the five cases was analyzed by means of a compiled theoretical framework of critical success factors. The empirical results led to a revision of the framework, identifying eleven critical success factors. These factors revolve around linking the ePortfolio with business objectives, carefully identifying information requirements and selecting a suitable system, actively managing the implementation by appropriate and dedicated staff throughout the organization, and ensuring that employees have ownership over their ePortfolio profiles.

As a result of contemporary shifts in worker demographics and structural changes to the nature of work, there is a need for firms to prepare and utilize their workforce in an appropriate manner. Therefore, in recent years human resource management (HRM) scholars have paid increasing attention to the management of human capital (HCM) in organizations throughout the entire employee life cycle, with a growing emphasis on learning and development, performance and incentive management, employee retention, workforce planning, and worker redeployment (Schweyer, 2010).

Despite often-heard claims that human capital is the most valuable resource of an organization, firms that proactively act on this notion by implementing HCM processes (e.g., strategic workforce planning) are few and far between (Huber, 2012). In 2013, CedarCrestone's 16th Annual Human Resources (HR) Systems Survey revealed that only 14% of respondents reported adoption of such processes (Martin, 2013). This can be explained by the fact that the HR profession is still developing an acquaintance with evidence-based management and by a lack of research on how to utilize existing information systems accurately and effectively for this purpose (Huber, 2012). Furthermore, the management of human capital is an intricate and complex process (Schweyer, 2010) that depends on the gathering and analysis of reliable, qualitative data about an organization's workforce. In the process of HCM, the gathering and interpretation of qualitative (e.g., competences-based information) and quantitative data (e.g., turnover rates) are vital (Pfeffer & Sutton, 2006; Rousseau, 2006; Westphalen, 1999). Empirical research has shown, however, that many organizations struggle to gather qualitative data on employee performance, potential, and competences (Lukaszewski, Stone, & Stone-Romero, 2008).

Barker (2003) proposed that ePortfolios are a feasible instrument in this process, due to their close linkage with the tracking and development of human capital, lifelong learning, and the assessment of prior learning by gathering qualitative data about individuals. ePortfolios possess unique properties that differentiate them from more commonly used human resource information systems. As a digital professional profile of an employee, an ePortfolio enables the capturing and comparison of qualitative data regarding the skill level and competences of employees, their ambitions, developmental potential, and career expectations (JISC, 2009; Smith, 1996; Woodbury, Addams, & Neal, 2009). Furthermore, in current times multiple career shifts are increasingly common. Therefore, there is a need for a so-called "career-passport," which professionals carry with them as they move from one setting to another (Clark & Eynon, 2009). The ePortfolio can facilitate this.

To this day, the ePortfolio has not been researched empirically in the organizational setting. The concept, which originated in the educational context, has however been argued to be suitable for professional purposes by many scholars in the ePortfolio domain (Balaban, Divjak, & Mu, 2011; Cambridge, 2010; Flanigan & Amirian, 2006; Greenberg, 2004; Jafari & Greenberg, 2003; JISC, 2009; Tosh & Werdmuller, 2004). This study aims to substantiate these claims by evaluating empirically the implementation of ePortfolio systems in organizations in an innovative three-year program called "Let's Connect," which took place from early 2012 until late 2014. The program aimed at enhancing the mobility of workers, both within and across organizations, by introducing an ePortfolio.

The aim of this research is to investigate the feasibility of ePortfolio use in the workplace. The objectives include establishing whether the implementations were successful and identifying the critical success factors. In order to achieve the research objectives, the following research questions were formulated:

1. To what extent were the ePortfolio implementations successful?
2. What critical success factors are associated with the implementation of an ePortfolio system in organizations?

Human Resource Information Systems

A *human resource information system* is a "technology-based system used to acquire, store, manipulate, analyze, retrieve, and distribute pertinent information regarding an organization's human resources" (Tannenbaum, 1990, p. 27). Examples of such systems include SAP and Oracle. A human resource information system comprises a database of performance-related information (Kavanagh & Thite, 2009; Kovach & Cathcart, 1999). The information relates to such aspects as recruitment, training and development, performance evaluations, and turnover rates (DeSimone, Werner, & Harris, 2002). Utilizing this information, organizations can effectively manage, develop, and deploy their human capital (Bassett, Campbell, & Licciardi, 2003; Lawler & Mohrman, 2004). Therefore, human resource information systems have been deemed critical contemporary HRM tools that enable organizations to transform data into critical business information (Marler & Floyd, 2009).

ePortfolio

ePortfolios are "personalized Web-based collections of work, responses to work, and reflections that are used to demonstrate key skills and accomplishments for a variety of contexts and time periods" (Lorenzo & Ittelson, 2005, p. 2). The information in an ePortfolio typically relates to work experience, ambitions, and acquired and developed competences and may include assessment results, research papers, certificates, reports on projects and teamwork, or internships (Flanigan & Amirian, 2006; Greenberg, 2004; Tosh & Werdmuller, 2004).

The ePortfolio is a broad concept with a wide array of definitions and described purposes. This is the result of two conflicting paradigms that surround the ePortfolio concept: the constructivist and positivist approaches. The constructivist approach emphasizes the learner's perspective and the importance of reflection and considers the ePortfolio as

> a learning environment in which the learner constructs meaning. This learning environment as given shape through the process of portfolio construction assumes that meaning varies across individuals, over time, and with purpose. The portfolio presents process, a record of the processes associated with learning itself; thus a summation of individual portfolios would be too complex for normative description. (Paulson & Paulson, 1994, p. 36)

The positivist approach, on the other hand, considers the ePortfolio a tool to assess externally defined learning outcomes and "assumes that meaning is constant across users, contexts, and purposes" (Paulson & Paulson, 1994, p. 36). The latter approach was central to the ePortfolio implementations in the Let's Connect program, due to the necessary evaluations of employee performance by certain organizational standards.

ePortfolio Implementations

While there is no existing framework for the evaluation of ePortfolio implementations in the workplace, there is a substantial amount of research towards ePortfolio implementations within educational institutes. The Learning Sciences Research Institute at Nottingham University developed the ePortfolio Maturity Model in 2007 to aid the monitoring of implementations (Hartnell-Young et al., 2007). This model can be found in Appendix A.

The ePortfolio Maturity Model (EMM) consists of factors that reflect the readiness of an educational organization to engage effectively in ePortfolio use. Such a model does not exist for ePortfolio use in the workplace. However, there has been substantial research towards the implementation of HR information systems in the workplace that can be used to complement this model. In the literature, this is better known as the critical success factors approach. One of the most cited definitions was introduced by Rockart (1979), who stated that critical success factors are "the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization" (p. 85). Today, information system experts increasingly use these factors to support the planning process (Esteves, 2004). The eight critical success factors identified in by Rockart and Delong (1988) have been reconfirmed by various other researchers (e.g., Bird, 1991; McBride, 1997; Paller & Laska, 1990; Watson, Rainer, & Koh, 1995). Poon and Wagner (2001) identified two additional factors from the literature, which resulted in the Executive Information System Success Factors (ESF) framework, as presented in Appendix B.

Method

This research was conducted in accordance with the interpretivist paradigm and followed a two-stage qualitative approach. First, a critical literature review was conducted to compile a theoretical research framework consisting of indicators of system success and critical success factors that could be used as a basis to evaluate the ePortfolio implementations. In the second stage, the critical success factors in this framework were empirically verified in five case studies using qualitative research methods.

Participants

The five organizations studied include five private, commercial businesses in the southeast region of The Netherlands (also known as the Brainport region). These businesses voluntarily enrolled in the project in early 2012 and completed the project late in 2014. They were provided with an ePortfolio system of their choice, free of charge, to experiment with. Table 1 provides a brief overview of their company size and number of participants in the pilot. The defined HCM goals and objectives and their outcomes for each of the five cases are presented in Appendix C.

Materials and Procedure

Stage 1. To establish whether the implementations of ePortfolio systems in the Let's Connect project were successful, the evaluation criteria have to be decided on. The literature on executive information systems provides a set of criteria that has been thoroughly researched by various scholars. In a study by Poon and Wagner (2001), five main criteria were distilled from the literature:

1. Access: the system is made available and users are given access to the system;
2. Use: the system is used by the intended users;
3. Satisfaction: users are satisfied with the system;
4. Positive impact: the system has positive impact on the executives and the organization;
5. Diffusion: the system tends to spread.

To contextualize and explain these outcomes, a systematic analysis of the implementation process is required. First, Poon and Wagner's (2001) five criteria are used to establish the degree of success in implementation and the suitability of ePortfolios for the workplace. Subsequently, to contextualize these findings and to explain success and failure, a framework of critical success factors is compiled. This framework consists of a combination of the EMM and ESF frameworks. Together, the two models share a degree of complementarity. The EMM model addresses factors that represent the unique characteristics of the ePortfolio by emphasizing such aspects as interoperability, autonomy in ePortfolio use, and the ownership of data. Furthermore, it consists of more generic factors related to the hosting institution and staff. These generic factors are covered more elaborately in the ESF framework, which has been validated through decades of empirical research. The two models' frameworks were compared side by side, identifying unique and overlapping factors. This comparison resulted in the Combined Critical Success Factors (CSF) framework, as depicted in Table 2. The left and right columns include 19 unique factors from both sources, while nine overlapping factors are presented in the middle column. Factors from the EMM framework, which was originally designed for the educational context, have been reworded, where appropriate, to represent the workplace.

Stage 2. To identify the critical success factors of ePortfolio implementations, five case studies were analyzed. After establishing whether an implementation was successful, the critical success factors determining success and failure were analyzed through primary and secondary data collection. To facilitate data triangulation, the questions were answered through an analysis of different sources, including project documentation (e.g., presentations, field notes, and meeting reports) and through semi-structured interviews conducted at the beginning and final stages of the project. The interviews were held with HR-personnel involved in the implementation process and with employees using the ePortfolio. To answer the first research question, the fulfilment of the five main success criteria was established by seeking answers to such questions as "Does the organization intend to continue with the ePortfolio after the pilot phase?" (representing diffusion) and "To what extent were pre-defined HCM goals and objectives reached?" (representing positive impact). To determine the critical success factors in all cases, all factors from the compiled framework are discussed as themes in a semi-structured interview. Examples of interview questions included "To what extent did you define system requirements for the ePortfolio?" and "In your view, does the ePortfolio belong to the organization or the employee?" In the search for patterns, the similarities and differences about relationships within the data are examined. Cross-case analysis is conducted to examine the identified CSFs.

The method involves a content analysis to corroborate the compiled CSF framework and make adjustments where appropriate. Content analysis entails a systematic, rigorous examination of data that results in discerning themes (Marsh & White, 2006). As a

Table 1
Participating Pilot Organizations

	Case studies				
	C1	C2	C3	C4	C5
Sector of industry	Materials	Industrial	Materials	Information Technology	Materials
Company size (# of employees)	500+	500+	100-250	100-250	0-10
Participants	70	40	58	20	7

Table 2
Critical Success Factors Framework for ePortfolio Implementations

	Source		
Critical success factor	ESF	EMM	Overlap
Committed and informed executive sponsor	X		
Appropriate supporting staff	X	X	Staff ICT Skills Staff engagement Staff providing feedback
Operating sponsor	X		
Appropriate technology	X	X	Usability Reusability
Management of data	X	X	Connectivity Interoperability
Clear link to business objectives	X	X	ICT policy ePortfolio policy
Management of organizational resistance	X		
Management of system evolution and spread	X		
Evolutionary development methodology	X		
Carefully defined information and system requirements	X		
Employee autonomy in learning		X	
Employee autonomy in ePortfolio use		X	
Electronic links to the organization		X	
Access to ePortfolio		X	
Employees as active users		X	
Employees as seekers of feedback		X	
Engagement of employees		X	
Institutional embedding		X	
ePortfolio ownership		X	

Note. (Hartnell-Young et al., 2007; Poon & Wagner, 2001)

result, a redefined CSF framework for ePortfolio implementations in organizations was developed.

Results and Discussion

ePortfolio Success

Overall, the organizations experienced varying success rates in implementing the ePortfolio. Despite the fact that the ePortfolio was available without restrictions in most organizations in terms of accessibility, the system failed in all other areas in three out of five organizations (see Table 3). These areas are discussed in detail below for each case study.

Case 1. The implementation was a failure in Case 1 (C1). In terms of accessibility, participants indicated that they had no problems accessing the system. The ePortfolio, over the course of a year, was used once by all participating employees. They completed their profile and did a standard assessment. Staff members who were responsible for on-the-job learning with the ePortfolio did not use or promote the system. Reported satisfaction with the ePortfolio was, however, high among all participating employees. They indicated that it could be a very useful tool for their professional

Table 3
Pilot Outcomes

	Case Studies				
	C1	C2	C3	C4	C5
Access	±	✓	✓	✓	✓
Use	×	×	±	±	×
Satisfaction	×	×	✓	✓	×
Positive impact	×	×	±	✓	×
Diffusion	×	×	✓	✓	×
Overall	×	×	✓	✓	×

Note. ✓ = Successful, ± = Acceptable, × = Unsuccessful.

development and careers and wished that the organization had made better arrangements to ensure a proper implementation. The ePortfolio ultimately did not have a positive impact; none of the HCM goals were reached, and only one of the six objectives was partially reached. Consequently, the ePortfolio use did not spread, and the system has been discontinued.

Case 2. The implementation was a failure in Case 2 (C2). In terms of accessibility, participants indicated that they had no problems accessing the system. The ePortfolio, over the course of 2 years, was used once by all participants, who completed their ePortfolio profile and a personality test. However, there was no follow-up to this by the organization, despite some employees showing interest in the system. Reported satisfaction levels with the ePortfolio were low. Some workers indicated that it could be a useful tool for their professional development and careers and thought of the ePortfolio as complementary to their LinkedIn profile due to the personality test and assessments, if it were used actively in the organization. Others employees were skeptical of the ePortfolio and feared that the contents would be used in lay-off procedures. In addition, the HR manager was not satisfied with the quality of the assessments included in the system. The ePortfolio did ultimately not have a positive impact; none of the HCM goals or objectives were reached. Consequently, the ePortfolio use did not spread and the system has been discontinued.

Case 3. The implementation was a success in Case 3 (C3). In terms of accessibility, participants indicated that they had no problems accessing the system. All participants used the ePortfolio once. Reported satisfaction with the ePortfolio was high among all participating employees. They indicated that it was convenient to have the system integrated into the HR system they were already using. Consequently, they had a single-access point for all employment-related matters such as salary slips, completed training, and developed competences. The ePortfolio did have a positive impact; the two HCM goals were partially reached, as the process was on-going when this present paper was published. Both the HR manager and the participating employees believed that the introduction of the system contributed to talent management and mobility, and that effects will materialize in the long run. The organization has decided to use the ePortfolio as an inherent part of future performance appraisals; as such, the system has spread across the organization. Four of the eight objectives were reached; the remaining four are in progress. The organization decided to continue ePortfolio use in the organization after the project.

Case 4. The implementation was a success in Case 4 (C4). In terms of accessibility, all participants indicated that they had no problems accessing the system. The ePortfolio was used multiple times by all participants, who had feedback sessions with supervisors. Reported satisfaction with the ePortfolio was high among all participants. Both supervisors and employees indicated that the ePortfolio was extremely useful as a basis for performance appraisals. The HR manager was satisfied that they managed to structure the ePortfolio in accordance with existing competence profiles in the organization, which can enable the organization to make a quick scan of all present competences in the organization. The organization and its employees were positive that the ePortfolio will reach the HCM goals across the entire organization once its development is complete, which is illustrative of the positive impact of the ePortfolio. Furthermore, efforts are currently being made to collaborate with a local university to achieve consensus on a fixed set of competences that can then foster the recruitment of graduates through standardized competence profiles. Their ePortfolio system will then function as a linchpin between the organization and university. Three of six objectives were reached; the remaining three are in progress. The organization is continuing ePortfolio use after the project.

Case 5. The implementation was a failure in Case 5 (C5). In terms of accessibility, there were no experienced issues. The ePortfolio system was used once during a brief introduction by the HR manager. Users were not satisfied with the system and indicated

they were not interested in using it. The ePortfolio did not have a positive impact in the organization, none of the HCM goals was reached, and only one out of four objectives was accomplished (i.e., describing relevant competences for various functions). The organization decided to discontinue ePortfolio use.

Implementation

To contextualize these findings and to identify critical success factors that impacted success of implementation, all factors from the CSF framework were analyzed for each case study and compared across all cases (see Table 4). First, constant factors across all cases are discussed, followed by factors in which there were notable differences between successful (C3, C4) and unsuccessful (C1, C2, C5) cases.

Constant factors across successful and failed cases. In both successful and failed implementations, the moderate levels of employee autonomy in learning and ePortfolio use seemed to have been a constant. All organizations indicated that employees were provided with a certain degree of freedom in defining professional learning goals and using the ePortfolio, as long as these goals and activities were relevant to the function in which they were employed or to which they were aspiring to grow. The nature and contents of the assessments were dictated by the organization. As one HR manager stated, "We want to use the ePortfolio for performance appraisals; therefore, the ePortfolio contents and use must be related to competences which we find relevant for a particular function" (C3). This is necessary because the ability to benchmark qualitative ePortfolio data is inherent to nearly all formulated HCM goals and objectives, in line with the positivist perspective on ePortfolios (in which externally defined learning outcomes are crucial). Therefore, these factors can be considered irrelevant, as they are inherent to the workplace and human capital management. This factor originates from the ePortfolio Maturity Model, which was tailored to the educational setting and, as such, places more emphasis on the constructivist perspective (in which ePortfolio meaning is mostly limited to the individual).

Furthermore, in all five cases the electronic links to the organization and access to the ePortfolio were mostly unhindered. The former is unsurprising, given the increasingly interconnected nature of the workplace through cloud-based applications; therefore, this factor can be considered outdated and irrelevant. As for access to the system, a few minor complications were reported with regards to login problems in the early phase of the pilot; however, these were resolved quickly, and participants were all able to access the ePortfolio whenever they wished to do so.

A striking observation is that all five organizations suffered from the lack of a committed and informed executive sponsor. This is illustrated by the following quotes during the interviews with HR managers: "Executive management support merely consists of them allowing me to spend time on it" (C1); "[The company executive] never has time to discuss this project with me; he initiated the project and delegated it to me" (C3); and, "The company CEO made arrangements to participate in this project and handed it over to [the HR department]" (C4). As a result, the responsibility for implementation rested with the supporting staff and operating sponsor in all organizations; however, in C5, due to the small size of the company, one person fulfilled all three roles. It seems that while the executives of the organizations were in favor of the project, their actual involvement was relatively hands-off. Arguably, this can be attributed to the subsidy-driven nature of the project, and the lesser urgency compared to intrinsic business needs. Three managers (C1, C2, C5) similarly stated that they did not have time for it now, as the business had more urgent priorities.

Factors fulfilled in successful cases and unfulfilled in failures. The presence of active information system (IS) support and an operating sponsor were two of 13 factors in which there are distinct differences between failed (C1, C2, C5) and successful (C3, C4) cases. In the failed instances, both the HR manager and the employees reported that the ePortfolio was not actively managed by the organization. In C1, employees indicated that the HR manager briefly introduced the ePortfolio to them, but that there was no follow-up, causing the participants to lose interest. In this case, the HR manager himself also admitted that the ePortfolio was low on his priority list due to the effects of the economic crisis on his organization and due to the fact that there was no operating sponsor who could manage the implementation. One important objective here was to strengthen the relationship with the in-house educational provider through the ePortfolio; in the interview, however, the manager stated that he gave up on this after the "educational institute didn't call me back about it." Confronted with the lack of progress the organization was making throughout the project, the manager insisted that it was "a complex project, which requires more time."

In C2, the HR manager indicated that she had lost interest due to an interplay of other factors: (a) promises about the ePortfolio's functions were not lived up to, and the quality of standard assessments was disappointing (appropriate technology); (b) employees were skeptical about the organization's intentions with the ePortfolio (managing organizational resistance); and (c) other staff members were struggling with the

Table 4
Critical Success Factors Outcomes

Critical success factor	Case studies				
	C1	C2	C3	C4	C5
Committed and informed executive sponsor	×	×	×	×	×
Appropriate supporting staff	×	×	✓	✓	±
Operating sponsor	×	×	±	✓	×
Appropriate technology	✓	×	✓	✓	×
Management of data	×	×	✓	✓	×
Clear link to business objectives	×	×	✓	✓	×
Management of organizational resistance	×	×	✓	✓	×
Management of system evolution and spread	×	×	✓	✓	×
Evolutionary development methodology	×	×	✓	✓	×
Carefully defined information and system requirements	×	×	✓	✓	×
Employee autonomy in learning	±	±	±	±	±
Employee autonomy in ePortfolio use	±	±	±	±	±
Electronic links to the organization	✓	✓	✓	✓	✓
Access to ePortfolio	±	✓	✓	✓	✓
Employees as active users	×	×	✓	✓	×
Employees as seekers of feedback	×	×	✓	✓	×
Engagement of employees	×	×	✓	✓	×
Institutional embedding	×	×	✓	✓	×
ePortfolio ownership	±	×	✓	✓	✓

Note. ✓ = Successful, ± = Acceptable, × = Unsuccessful.

concept of competences (managing organizational resistance). In this case, an operating sponsor was also lacking. In C5, the company executive (also acting as IS support and operating sponsor), did not have sufficient time for the pilot: "In a small company such as mine, you either need someone who is fully dedicated to the implementation or a system which is instantly ready to use; I simply did not have the time."

In C3, the combined role of IS support staff and operating sponsor also rested with the HR manager; however, she did manage to accomplish a partially successful implementation. She indicated that although it was tough to handle the entire project, she systematically (albeit slowly) developed the system in accordance with the organization's needs, gathering support by frequently discussing the project with employees and senior management. In an interview, she stated that the project would have developed more quickly if it had not rested completely on her shoulders. In C4, the role of IS support rested with the HR manager, and another HR staff member functioned as operating sponsor. They also held frequent meetings with employees and senior management to ensure that the ePortfolio was aligned with organizational needs. In both cases, this method of evolutionary development resulted in an absence of organizational resistance.

The management of the system's evolution and spread, in which the ePortfolio is tailored to the needs of the organization and its users, was lacking in the failed cases. In C1 and C2, employees indicated that no efforts were made by the organization to cater to their needs and that their feedback was not acted upon. In C2, an employee stated, "we thought the project was finalized 2 years ago; we did not hear anything from the organization since the system was introduced." Similarly, in the case of C1, employees were in agreement that the organization's efforts were "lackluster." In C5, the CEO also struggled to develop the ePortfolio, despite being aided by an additionally hired HR consultant halfway through the pilot. In the two successful cases, the operating sponsor held meetings with supervisors and employees to develop further the system. This resulted in C3 being successful by embedding the ePortfolio in the company's existing HR software, and C4 switching to a different ePortfolio supplier after employees and staff complained about the quality of standard assessments of the previous system. For example, one staff member stated, "They were similar in quality to those you find in a magazine at the dentist's office."

In the three failed cases, there was a lot of unmanaged resistance against the ePortfolio implementation. In C1, employees were enthusiastic about the system's possibilities; however, they expressed dissatisfaction with the way the system was introduced and distrust in the organization's intentions. They indicated that an HR manager briefly introduced the ePortfolio to them but that there was no follow-up,

which led to the participants losing interest. Furthermore, participants seemed to be wary of the organization's intentions. They expressed a fear of being monitored and thought the ePortfolio could be used against them in the case of lay-offs. It also became apparent that employees had to request permission from the HR manager to share their ePortfolio contents with others. This reinforced their suspicions about being monitored and their reserved attitude. Furthermore, staff members responsible for on-the-job training were known to resist the ePortfolio system, and the HR manager did not address the issue.

In C2, there also was a group of employees who feared that ePortfolio contents would be used in lay-off procedures. In this respect, the organization admitted that the introduction of the ePortfolio system and its purpose to this group was flawed. This occurred in the beginning of the project and was reported to have impacted the reputation of the project through word of mouth. Furthermore, the HR manager was dissatisfied with the purchased ePortfolio system (a decision made by the corporate executive), which did not meet her expectations. She felt that the quality of the assessments included was sub-par and that a lot of work and time were required to adapt the ePortfolio to the organization. In C5, this resistance was caused by employees uninterested in the system, who stated that they did not understand what it was about and why it was needed. The company executive admitted that he had failed to gather support for the system. He attributed this to a lack of time, which resulted in a slow customization of the system, tailored to the company's needs (a lack of evolutionary development). In addition, he said that in hindsight, he wished he had considered other ePortfolio systems to compare customization options and user-friendliness, which he felt were lacking in his system.

The choice of an appropriate ePortfolio system turned out to be of crucial importance in three other cases. In C2, the ePortfolio was considered unsuitable to meet the company's HCM goals and objectives. The competence assessments lacked substance and were "more suitable for orientation purposes rather than evidence-based decision making." The HR manager said, "I feel like this ePortfolio system prioritized the technology over the quality of the competence assessments; it is not suitable for our needs." The HR manager in C4 had a similar stance but took efforts to switch to a more appropriate system. In these cases, the factor "management of data" was of great importance; the systems lacked the ability to provide access to reliable data on the employees' competences. Furthermore, the ePortfolios lacked sophisticated importing and exporting functionalities, which resulted in organizations being unable to exchange competence data with educational institutes. This can also be explained by the highly contextual nature of competences, which hindered standardization. The existing IMS standard and its derivatives do not facilitate the exchange of competence data. There are developments in this field, such as O*NET in the United States (including descriptions of competences related to various occupations) and the European Qualifications Framework; however, these have not yet been applied to an ePortfolio infrastructure. C4 is continuing to pursue this after the project by using an ePortfolio system that connects the company with a local university. This idea is similar to an Italian ePortfolio platform connecting the workplace and education, AlmaLaurea, which consists of a database of student ePortfolios from which companies can recruit graduates. C4 is making efforts also to include standardized competences to the platform they envisage.

In C3, no separate ePortfolio system was purchased; instead, the existing HR tool was customized to include desired ePortfolio functionalities (competence profiles of each employee). Only in C1, the system's choice did not have a significant impact.

In the two successful cases, there was a clear link between the ePortfolio and the business objectives. In C3, the HR manager stated, "Now that the ePortfolio's development is complete and that all our company's competence profiles are included, we can use the profiles of our employees as input for performance appraisals." In C4, the ePortfolio's added value also stemmed from the system allowing the organization to benchmark employees (in terms of their competences) and to start using the system for recruitment purposes in cooperation with a local university. The management of data was inherent to the successful linkage of the ePortfolio with business objectives. In turn, the successful management of data was dependent on a careful definition of information and system requirements. While in a broad sense all five organizations defined HCM goals and objectives, only in the two successful cases were efforts made to identify the exact information required from the ePortfolio to fulfill these. In C3 and C4, relevant competences for each participating function in the pilot were identified and described. In addition, meetings were held to identify the needs of all staff members that would be using the system. This information was crucial for customizing the ePortfolio in a manner that allowed it to be implemented effectively.

In two failed cases, ePortfolio ownership had a detrimental effect on the evolution and spread of the system. In C1, employees reported that they had to ask permission from their supervisor to share ePortfolio contents with others. Therefore, they felt that the system was only being used to monitor the employees and that they had limited freedom in the way it could be

used. The HR manager was unaware of this, indicating that this was an incorrect interpretation by the employees; however, the manager did not undertake actions to take away these concerns. In C2, the company executives expressed worry that the ePortfolio could be harmful for the organization, as it could facilitate the headhunting of talented employees by other organizations. Therefore, they insisted that ePortfolio ownership rested with the organization and that employees would be limited in sharing their profile.

The institutional embedding of, engagement with, and use of the ePortfolio by employees (e.g., activity and seeking feedback) was negative in the failed cases and positive in the successful ones (except for C5, in which case the company executive struggled to explain what the system was and why it was being introduced). Employees were unanimously positive about the concept of ePortfolio, but dependent on the implementation by senior management because this was a top-down organizational process. In each of the five cases, a combination of the factors discussed above resulted in a lack of use and engagement by the employees and in a lack of institutional embedding. As such, they were not of critical importance in these cases and can be considered as outcome measures rather than conditions for the implementation.

Judging by the outcomes, ePortfolio implementations in organizations are likely to be a best practice rather than a best fit. The processes show significant similarities in terms of factors that made a difference between success and failure. In each successful case, a different interplay of a constant set of factors made a difference. The successful cases demonstrated that linking the ePortfolio to business objectives by using appropriate technology, carefully defined information requirements, and an evolutionary development methodology with committed and informed staff led to a successful implementation. The failed cases suffered from a lack of informed and committed staff, which in turn resulted in a lack of information requirements, poor management of organizational resistance, and inappropriate technology being used. Furthermore, the cases in which ePortfolio ownership mostly remained with the employees led to an uptake in use and engagement. C5 was the least successful case, which can be explained by the relatively small company size compared to the other cases and the lack of HR expertise to implement a new information system. These observations result in the revised framework of critical success factors for ePortfolio implementations in organizations, as depicted in Table 5.

Limitations

One limitation of this study is related to generalizability. The sample size was relatively small. Furthermore, there were large differences between the five organizations. They all varied in company size, operated in different sectors, and faced different external pressures (e.g., the recession) impacting the time and resources allocated to this project. These contextual factors may have accounted for the different outcomes. However, despite these differences the CSFs identified shared a large degree of similarity across all cases and as such we have a deepened understanding of ePortfolio applications in the workplace.

Another limitation of this study is the external financial incentive for participation. All costs related to the purchase and use of ePortfolio systems were covered by the project. It is a possibility that implementation outcomes, as well as the accomplishment of critical success factors were affected by this.

Conclusion

This study aimed to investigate whether the ePortfolio is a suitable instrument for the workplace. This was researched by an analysis of a three-year case study that took place in The Netherlands. While the ePortfolio did not fully realize its potential in terms of facilitating mobility and life-long-learning, the two successful cases show that the ePortfolio can be a valuable instrument in the process of internal human capital management. In both cases, the system facilitated the gathering of qualitative data on competence mastery of employees that can be used for performance appraisals and to identify talented workers by comparing their competence profiles, in line with the theoretical assumptions on the utility of the ePortfolio. Organizations failed to exchange ePortfolio data with educational institutes to foster recruitment. This can be explained by the fact that the ePortfolios were used in isolation in the organizations, and that the import and export functionalities suffer from a lack of standardization.

Three out of the five cases failed to implement the ePortfolio, which is illustrative of the complexity that surrounds the implementation of such an information system. The only constant positive success indicator across all five cases was providing access to the system. To explain these findings, an analysis of the implementation processes in each of the five cases by means of a compiled theoretical framework of CSFs followed. This resulted in the identification of 11 critical success factors that impacted the ePortfolio implementations in this case study (Table 5). These factors can be summarized as (a) linking the ePortfolio with business objectives, (b) carefully identifying information requirements and selecting a suitable system, (c) actively managing the implementation by appropriate and dedicated staff throughout the organization, and (d) ensuring the employees have ownership over their ePortfolio profiles. In all five

Table 5
Critical Success Factors Framework for ePortfolio Implementations in Organizations

Critical success factor	
Committed and informed executive sponsor	Management of organizational resistance
Appropriate supporting staff	Management of system evolution and spread
Operating sponsor	Evolutionary development methodology
Appropriate technology	Carefully defined information and system requirements
Management of data	ePortfolio ownership
Clear link to business objectives	

cases, a combination of these factors determined failure or success.

This study contributed to the literature on ePortfolio use by investigating empirically theoretical claims about the utility of the concept in the workplace. This further advances the knowledge on the different applications of the concept. Furthermore, it provides organizations with a framework of critical success factor that can be used to plan an effective ePortfolio implementation. The Let's Connect program ultimately aimed to enhance mobility of workers. The research reveals that the ePortfolio's suitability for usage across different contexts is limited, due to the inability to exchange qualitative data in a uniform manner. This suggests that the ePortfolio can only perform effectively in a platform-function in which data is interpretable and exchangeable by all parties. Such a platform could not be realized within the timeframe of the Let's Connect program. Future research could investigate the effects of ePortfolio use in such a platform-function (e.g., AlmaLaurea), in which the exchange of qualitative data across different contexts takes place. Individuals and organizations that are part of such a platform could be followed to establish whether the ePortfolio fosters mobility.

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Appendix A
The ePortfolio Maturity Model

Maturity factor	Description
ePortfolio Policy	The institute has an articulated policy relating to ePortfolio purpose, use, and development.
Connectivity to support ePortfolio development	Systems are networked together to allow the sharing of ePortfolio resources.
Interoperability/transferability of data	The system offers flexibility with regards to the import and export of data.
Curriculum ICT Policy	A clear vision has been defined on the use of ICT in the institute
Institutional embedding	Acceptance of the ePortfolio in the institute.
Staff ICT Skills	The majority of staff is ICT affluent.
Staff engagement to ePortfolios	Engagement is universally positive.
Staff as providers of online feedback	Staff work regularly, constructively, and formatively on giving feedback on ePortfolio material.
Autonomy in the construction of ePortfolios	Students autonomy is encouraged as a matter of policy.
Student capability of autonomy in learning	All students are capable of making autonomous choices regarding their learning goals and style.
Student's electronic links to the organization	Students can access the ePortfolio from home.
Access to ePortfolio	The ePortfolio is available anywhere, anytime.
ePortfolio ownership	Students can decide which aspects of the ePortfolio are shared.
Learners as active creators of digital content	Students are active and regular creators of content.
Learners as seekers and users of feedback	Students seek feedback regularly.
Learner engagement to ePortfolios	Engagement is almost universally positive.
Usability	The interface is well designed and intuitive.
Reusability	Any agreed type of data/file can be stored.

Note. (Hartnell-Young et al., 2007)

Appendix B
Executive Information System Success Factors

Critical success factor	Description
Committed and informed executive sponsor	Executive sponsor who is committed to the implementation, invests time and effort and has a realistic understanding of the system.
Operating sponsor	Operating sponsor who actively manages the implementation and its details, to leverage the time of the executive sponsor.
Appropriate supporting staff	Supporting staff who have technical as well as business knowledge to support the implementation of the system.
Appropriate technology	Selecting the most suitable system on the market, which is crucial since the choice has a major bearing on the acceptance of the system.
Management of data	Ability to provide access to reliable data from internal and external sources. This may involve the aggregating, accessing and extracting data from various databases.
Clear link to business objectives	The benefits of the system and link to a certain business problem / objective are clearly defined. The system should provide something that adds value.
Management of organizational resistance	Proactively managing organizational resistance in the introduction and operational phase, which is a common cause of implementation failure.
Management of system evolution and spread	Identifying specific job functions, technical orientation, work style and support needs of each user.
Evolutionary development methodology	Prototyping to discover how the system can add value.
Carefully defined information and system requirements	Identifying information requirements that meet the organization's needs in terms of the defined objectives.

Note. (Poon & Wagner, 2001)

Appendix C
Goals and HCM Objectives for the Five Cases

C1	Result	
HCM goals	×	Shift to recruiting personnel based on competences (clusters of knowledge/skills/attitudes which enable a worker to work effectively).
	×	Structuring training and on-the-job learning with the ePortfolio by using elaborate competences.
	×	Recording and monitoring process of in-house education with the ePortfolio.
Objectives	±	Describing 16 job functions in terms of primary tasks in alignment with educational records
	×	Completed ePortfolio profiles of all employees currently involved in (internal or external) education.
	×	Identifying competences relevant for the different job functions and embedding them in the ePortfolio.
	×	Gaining insight in the talents of employees.
	×	Shortening duration of training due to enhanced insight in competence mastery levels.
	×	Expanding the number of participants to 200 in 2 years' time.

Note✓ = Successful, ± = Acceptable, × = Unsuccessful.

C2	Result	
HCM goals	×	Improve the composition of teams based on competence assessments in the ePortfolio
	×	Fostering internal mobility (redeploying personnel in positions appropriate to their competences) through identifying talented employees based on ePortfolios
Objectives	×	Develop a valid competence test to be used in the ePortfolio
	×	Completed ePortfolio profiles of all participants
	×	Gain insight in the competences of participants on an aggregate level
	×	Expand the number of participants

Note. ✓ = Successful, ± = Acceptable, × = Unsuccessful.

C3	Result	
HCM goals	±	Gain insight in professional development of employees.
	±	Fostering (internal and external) mobility of employees.
Objectives	✓	A description of all job functions, roles, tasks and associated competences.
	✓	Completed ePortfolio profiles of all participants.
	±	Including ePortfolio training in the company training.
	✓	Embedding the ePortfolio in the existing HR software.
	±	Active use of ePortfolios among employees.
	±	Gain insight in the talents of employees.
	±	Expand the number of participants to 120.
	±	Exchanging data on requested competences with the vocational institute where employees are recruited from.

Note. ✓ = Successful, ± = Acceptable, × = Unsuccessful.

C4	Result	
HCM goals	±	Fostering (internal and external) mobility of employees.
	±	Improve the composition of teams based on competence assessments in the ePortfolio.
	±	Stimulating professional development of employees.
Objectives	✓	Completed ePortfolio profiles of all participants.
	✓	Active use of the ePortfolio system by both the participants and supervisors
	±	Insight in the competences of participants on an aggregate level.
	±	Developing a competence test which is linked to relevant job functions in the pilot.
	±	Exchanging data on requested competences with a local university to recruit graduates more effectively.
	✓	Embedding existing competence profiles of the organization in the ePortfolio.

Note. ✓=Successful, ±=Acceptable, ×=Unsuccessful

C5	Result	
HCM goals	×	Enhancing the professional development of employees,
	×	Stimulating mobility of employees.
Objectives	×	Describing relevant competences for the job functions in alignment with vocational training institutes.
	×	Recording both the vocational generic competence levels of employees in the ePortfolio.

Note. ✓ = Successful, ± = Acceptable, × = Unsuccessful.