Who's up Next? A design science research project to support succession management through information systems

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Abstract

Today, large organizations use succession management to retain and develop employees in order to avoid vacancies and ensure competitiveness. However, succession management is a complex task. Especially the effort for finding suitable successors through matching employee characteristics (e. g. competences) with position requirements grows exponentially with firm size. Succession management systems that store decision relevant information and provide functionalities to process them in a way, that decision-making is supported, can reduce this complexity. Nonetheless, there is only little research concerning the design of such systems that could inform actual instances. In this paper, we employ design science research to develop design principles for succession management systems. For this purpose, we use a kernel theory and conduct an interview study among 21 organizations to explore meta-requirements and translate them into design principles. Subsequently, we test these principles by developing and evaluating an instantiation. In doing so, we extend the knowledge base through providing design propositions based on expert knowledge.

Keywords: Design Science, Design Principles, Human Resource Information Systems, Succession Management Systems, Human Resource Decision Support Systems.

1 Introduction

The human resource (HR) departments of organizations have to use several methods to persist in the war for talents (Chambers *et al.*, 1998). One of these methods is succession management, which is used to develop and retain employees to avoid negative effects on the competitiveness of the organization (like skill shortages and vacancies) (Hurd and Buschbom, 2010, p. 96). But succession management is a complex task, if it is considered in medium and large organizations. For example, the required information about employees (e. g. competences or preferences) and positions (e. g. requirements) are spread across organizational divisions (Rothwell, 2010). Thus, information about employees has to be gathered with standardized methods and the requirements of positions have to be defined within each division (Barnett and Davis, 2008; Groves, 2007, p. 241). Afterwards this information has to be forwarded to the central HR department that is responsible for succession planning. All this must be done simultaneously in all organizational divisions to ensure, that the information is still up-to-date during the succession management process. Furthermore, the main reason for the complexity is the creation of the succession plans, since a large manual effort is necessary to find suitable successors for positions by matching employee characteristics (e. g. competences) with position requirements. Thereby, a matching can also reveal, that there is no appropriate succession candidate, so that the recruitment of new employees is required.

However, an information system (IS) is able to address these challenges (Davenport, 1993). For example, an IS enables easy information collection by providing relevant information about employees and positions, so that all authorized managers and HR professionals can access them. Furthermore, the manual effort within the complex task of matching can be reduced, since an IS can process the employee and position related information automatically to suggest candidates for succession plans. Moreover, the automatic processing of such information is very fast in contrast to the manual matching, so that more employees can be considered in the creation of succession plans. Besides this, such a matching functionality can also be utilized to identify suitable employees for new positions within an organization. Due to these potentials and because there is only few research regarding the design of IS that support succession management (Dulebohn and Johnson, 2013; Simon, 2010), our aim is to address this lack of research. Hence, we develop design principles for succession management systems based on requirements from theory and practitioner insights (by conducting interviews among HR professionals). These principles can be used to guide the actual implementation of succession management systems. Thus we ask the following research question:

> ***RQ1:*** *How should an IS be designed to increase the efficiency and effectiveness of the succession management process?*

Based on this design proposition, we develop a mockup design of a succession management system. This instantiation is then be used to evaluate the design principles through another interview study among HR professionals. Thereby we verify, if and how the deduced design principles can be implemented within an IS and whether these principles have the attributed effects on process efficiency and effectiveness. According to this we also ask:

> ***RQ2****: How can an IS be implemented that embodies the deduced design principles?*

According to this, the paper is organized as follows. In section two we examine the related research in the domain of succession management. In the following section three, we present the research design of this paper. According to our research design, we develop design principles for succession management systems in section four. Thereby, we first derive meta-requirements from theory as well as from an exploratory interview study among 24 experts from 21 organizations before these meta-requirements are transformed into design principles. In section five, we present a mockup design of a succession management system grounded in our design principles, which is empirically evaluated afterwards. Subsequently, we discuss the results and limitations of our work in section six. Finally, we summarize our findings and reveal the contributions of our work in section seven.

2 Succession Management

Succession management is a systematic **process** with which re-staffing can be ensured, so that key positions in an organization are refilled with qualified employees prior to or shortly after a vacancy appears (Rothwell, 2010). Thereby, the term key position refers to positions that either have a medium or large effect on the success of the organization (e. g. upper level of hierarchy or specialists) or influence many employees directly or indirectly (e. g. supervisors or opinion leaders). The succession management process is divided into the two sub-processes preparation and execution (see Figure 1).

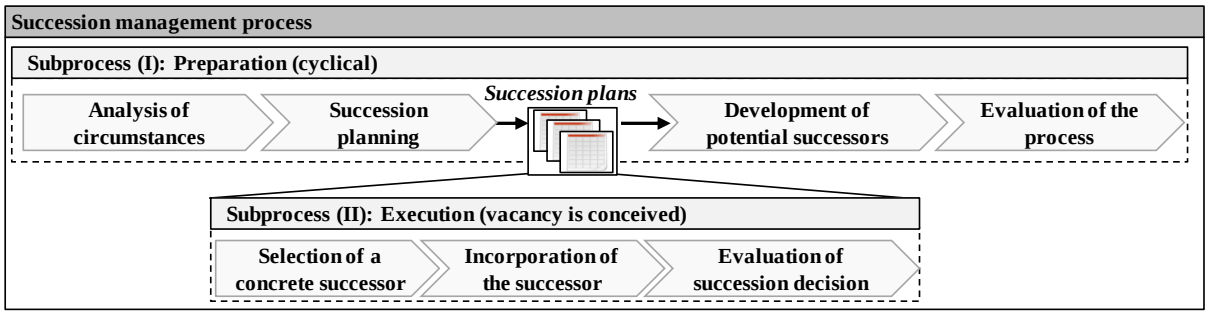

Figure 1. Succession management process

The first step in the sub-process preparation is the analysis of the circumstances (e. g. organizational strategy) and the definition of the strategic direction of succession management (e. g. the organization of the process or considered key positions) (Rothwell, 2010; Conger and Fulmer, 2003). In the second step, information about key positions (current and future requirements) and employees (competences and preferences) is gathered before this information is used to find appropriate potential successors and thus to create succession plans for each key position (Hurd and Buschbom, 2010; Barnett and Davis, 2008; Rothwell, 2010). The third step is the preparation of development plans so that the candidates can acquire the needed competences for their next position (Lindgren *et al.*, 2004; Barnett and Davis, 2008). In the fourth step, an evaluation is conducted, which focuses on the efficiency and effectiveness of the process (Conger and Fulmer, 2003).

The sub-process execution is started if a vacancy is conceivable (e. g. the actual incumbent will retire soon) or exists (e. g. an employee is deceased). If this case occurs, the succession plan for this position is utilized to reveal the potential successors. If an internal candidate is selected as successor, a so called domino reaction is triggered because his previous position becomes vacant and must be staffed (Rothwell, 2010). The incorporation of the selected successor can be supported through exit interviews with the former holder of a position or mentorships (Leibman *et al.*, 1996; Chatzimouratidis *et al.*, 2012). After the successor is incorporated in his new position, another evaluation to assess the success of the successor within the new position is conducted (Kavanagh and Thite, 2009).

Succession management systems support managers and HR professionals in decision-making (e. g. the selection of an appropriate successor) through providing information about employees (e. g. competences and preferences of employees), the organization (e. g. requirements for positions), and the combination of both (e. g. matching of competences and position requirements) (Beckers and Bsat, 2002). Thus a succession management system can be classified as a human resource decision support system (HRDSS) (Meinert and Davis, 1989; Chermack, 2003; Dulebohn and Johnson, 2013). Thereby, the term HRDSS refers to decision support systems in the context of HR tasks, which include the hardware and software that is necessary to process the available input data and to distribute the required output to decision makers (Chatzimouratidis *et al.*, 2012). HRDSS in turn are a class of human resource information system (HRIS) which include all information systems within human resource management (HRM) (DeSanctis, 1986; Kumar and Pandya, 2012).

Although there is related research regarding HRDSS (e. g. Sturman *et al.*, 1996; Mohanty and Deshmukh, 1997; Canós and Liern, 2008; Beckers and Bsat, 2002) and the design of HRDSS (e. g. Ramli *et al.*, 2010; Sniezek *et al.*, 2002), none of these articles focuses on design principles for HRDSS, which could be used as a starting point to deduce design principles for succession management systems.

In the domain of succession management itself, most articles concern financial, tax, and legal aspects and only a few publications consider the design of information systems (e. g. Dulebohn and Johnson, 2013; Simon, 2010; Lindgren *et al.*, 2004). The authors Dulebohn and Johnsen (Dulebohn and Johnson, 2013) revealed that especially efficiency and effectiveness metrics (e. g. competence development expense per employee) are relevant for succession management and thus an IT solution needs functionalities to provide these metrics. Simon (Simon, 2010) and Lindgren et al. (Lindgren *et al.*, 2004) developed design principles for competence management systems. However, these design principles don't cover the two core tasks "succession planning" and "execution of succession". According to this, we will address this lack of research through the development of design principles for succession management systems that explicitly cover both sub-processes. Hence, functionalities to support competence assessment and competence development are not in the focus of our work.

3 Research Design: Design Science Research

This paper aims to develop design principles for succession management systems, to provide knowledge about how such systems should be designed to efficiently and effectively support the succession management process. In order to test the design principles, we develop an artifact-based solution. According to this, we use the design science paradigm (Hevner *et al.*, 2004). The goal of a design science research (DSR) project is "the development of a technological solution to all or an aspect of the problem" (p. 406) (Kuechler and Vaishnavi, 2012). Thereby the contribution to the knowledge base may consist of design theories (level three), constructs, methods, or design principles (level two), or instantiations (level one) (Gregor and Hevner, 2013).

We use the DSR methodology from Vaishnavi and Kuechler (Vaishnavi and Kuechler, 2008) for structuring the research and employ the three design science research cycles from Hevner (Hevner, 2007) to outline, how rigor and relevance within each step of our research are ensured. Figure 2 depicts the research design, which is explained in the following.

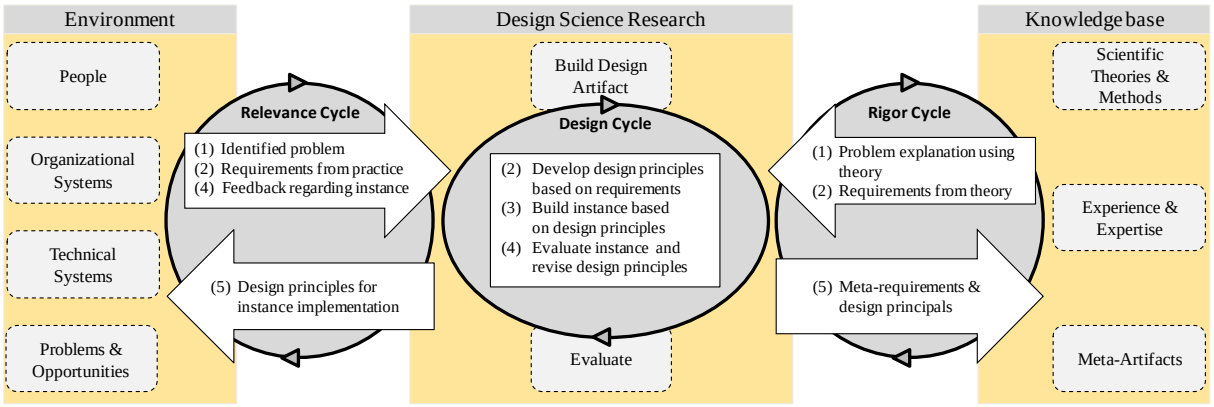

Figure 2. The steps of our research within the design science research cycles (based on Hevner, 2007; Vaishnavi and Kuechler, 2008)

The first step within the DSR methodology is to gain awareness of the problem (1) (Vaishnavi and Kuechler, 2008), which we already did in the introduction. Subsequently, we capture the problems of HR departments and apply a kernel theory to define the problem (Markus *et al.*, 2002; Walls *et al.*,

1992). To further ensure both rigor and relevance (Hevner, 2007) within the suggestion step (Vaishnavi and Kuechler, 2008), we do two things: First, we employ the existing knowledge of a kernel theory to inform the artifact construction by deriving meta-requirements (Walls *et al.*, 1992; Gregor and Hevner, 2013). Second, we use an exploratory interview study among 21 organizations to ascertain the relevance of our work and to collect further meta-requirements (Walls *et al.*, 1992) for succession management systems from practice. Based on these meta-requirements, we deduce design principles that can inform the design of such systems. These suggestions provide the foundation for the development step (3). During this step, concrete design decisions based on the design principles are made and implemented in a mockup design so that a new instantiation is developed. Thereby, the novelty of this instantiation "is then primarily in the design, not in the construction of the artifact" (p. 21) (Vaishnavi and Kuechler, 2008). Subsequently the instantiation must be evaluated (4) (Aier and Fischer, 2011). During this step the "utility, quality, and efficacy of a design artifact must be rigorously demonstrated via well executed evaluation methods" (p. 85) (Hevner *et al.*, 2004). Therefore, we interviewed experts from seven organizations that already participated in the first interviews. Finally the conclusion step (5) summarizes the contribution for knowledge base and organizations. According to this, our contribution to the existing knowledge base can be classified as level one (instantiation) and level two (design principles) (Gregor and Hevner, 2013).

4 Deduction of Design Principles

4.1 Meta-Requirements from Theory

The HR departments use succession management to develop and retain employees. However, since the information regarding employees (e. g. competencies, preferences) is possessed by respective employees, an information asymmetry exists. This problem can be described by drawing on the principal-agent theory (Jensen and Meckling, 1976). This theory suggests that between two contracting parties (principal and agent), where the principal delegates tasks to an agent, an agency relationship exists (Jensen and Meckling, 1976). In the context of succession management, this relationship includes an information asymmetry in terms of "hidden information" (Arrow, 1985), because the employee (agent) has more information about his competences, preferences, and career goals (Eisenhardt, 1989; Chua *et al.*, 2003). Thus, managers and HR professionals (principals) must perform screening activities (Stiglitz, 1975) to gather this information from the employees (agent). Although the information is available within the organization (as a result from other HR instruments like competence and performance management) it is distributed among different departments, managers, HR professionals, and IS. Thus, managers and HR professionals must access different IS and manually collect all required information. While the principals perform these activities to reduce the information asymmetry, agency costs occur (Jensen and Meckling, 1976). However, since the key idea of principal-agent theory is an efficient organization of information (Eisenhardt, 1989), the agency costs should be reduced while the information asymmetry is decreased.

According to Walls et al. (Walls *et al.*, 1992), we use the principal-agent theory to derive meta-requirements for succession management systems. To overcome the problem of hidden information, an IS must contain functionalities to provide employee related information to the principal. Moreover, to reduce agency costs while making information available, a succession management system should include functionalities to support decision-making by processing information of employees and positions (e. g. finding suitable successors by matching employee competencies and position requirements; **MRT1**). The agency costs can also be lowered if such a system can proactively initiate workflows and thus informs managers and HR professionals if succession related events occur (e. g. an occurring vacancy; **MRT2**). By using such functionalities, managers and HR professionals don't have to spend time on manually checking the system but are informed if there is some need for action. In addition, functionalities for processing succession plans to determine the possible domino reaction and thus reveal other tasks (e.g. recruitment of new employees, if no internal successor is available;

MRT3) can decrease agency costs, since manual effort to determine the domino reaction can be avoided.

Table 1 shows the derived MRT according to the information asymmetries in the succession management process. According to Vom Brocke et al. (2009) we structured the deduction of MRT along the information asymmetries in the succession management process to ensure comprehensibility. Nevertheless, we can't ensure exhaustiveness of the MRTs for succession management systems.

Main-Purpose according to Principal-agent theory	**Information asymmetries in succession management process**	**Meta-requirements from theory**
Reduce agency costs due to decreased manual effort while information asymmetry is reduced.	HR professionals and managers don't know the best successor for each position since they have no information about e. g. the competences of all employees *(Step: Succession planning)*.	**MRT1.** Succession management systems should suggest succession candidates.
	In most cases, HR professionals and managers don't know, at which time the execution of the succession plan is required *(Triggering subprocess II)*.	**MRT2.** Succession management systems should inform managers and HR professionals about succession related events (e. g. dismissals from employees).
	HR professionals and managers don't recognize the effects of an internal succession decision at first glance *(Step: Selection of a concrete successor)*.	**MRT3.** Succession management systems should reveal domino reactions.

Table 1. Meta-requirements for succession management system from theory

4.2 Meta-Requirements from Practice

To identify additional meta-requirements, we conducted semi-structured, exploratory interviews with 24 HR professionals (e. g. HR department heads or succession management process managers) from 21 German companies. We contacted a whole of 252 German companies which were selected due to their industry (to ensure a variety of different industries) and their size (only companies with more than 1,000 employees were selected so that succession management is a relevant topic for all interviewed experts) to ensure a purposeful sample (Sandelowski, 1995). We used theoretical sampling and decided not to conduct additional interviews as the last interviews did not reveal any new insights so that theoretical saturation was reached (Corbin and Strauss, 2008). Table 2 depicts the overall characteristics of our sample.

Industry	No. of Employees < 10k	10k-50k	>50k	Experts
Financial Services	1	2	1	1, 11, 17, 20
Automotive	1	-	3	2, 9, 18, 21
Services	-	2	-	3, 7, 8
Manufacturing	2	3	-	4, 5, 6, 13, 14, 15, 23
Energy Utility	1	-	-	16
Chemical and Pharmaceutical	-	3	1	10, 19, 22, 24
Information Technologies	-	-	1	12
Sum	**5**	**10**	**6**	**24**

Table 2. Sample characteristics

The interviews were conducted via phone between August and September 2013 and lasted between 30 and 60 minutes. They were performed by two interviewers who alternately asked questions. All interviews were recorded on tape and constantly transcribed and coded using the software ATLAS.ti. For the following analysis, all transcripts were translated into English using a constant contextual comparison (Suh *et al.*, 2008). As the result of the coding process, we identified 83 codes concerning requirements for succession management systems. Afterwards, we discussed the codes among the researchers and assigned the codes to the tasks "succession planning" and "execution of succession" (see section 2). Subsequently, we built mutually exclusive categories within both tasks. In the next step, we transferred these categories into requirements. Due to our focus on specific succession management requirements[1], we present four requirements concerning the succession planning and three requirements concerning the execution of succession. Furthermore, one requirement could be identified which is similar for both tasks.

Initially, an IS to support **succession planning** should process the employee and position related information in order to create succession plans (e. g. Exp, 16, 19; **MRP1**). Thereby, different matching criteria like competences, performance, potential rating, and professional experience should be used (e. g. Exp 7, 15). As a result, the system has to suggest the employees that have the best correspondence with the required competencies and moreover provide the performance, potential, and professional experience that are required for the particular position (e. g. Exp 1, 11). Furthermore, the system must ensure that an employee is listed as a successor only for a small number of positions, since a successor should not focus on only one position but should also not be contained in too many succession plans (Exp 15). These suggestions can then be used in a meeting of managers to finalize the succession plans (Exp 9, 19). To perform the matching, information about employees and positions must be available. Regarding this, the interviews reveal, that this information already exists in organizational IS (e. g. Exp 1, 7, 10, 24) and thus interfaces should be employed (e. g. Exp 2, 14; **MRP2**). In addition, the specified succession plans should be displayed in an organization chart, so that the status for each position is comprehensible (Exp 3, 19, 20; **MRP3**). Besides this, such an IS should employ specified succession plans to start subsequent tasks like the development of the potential successors (Exp 20, 21; **MRP4**).

The **execution of succession** should be supported through an IS by indicating conceivable vacancies based on information from the HR master data system (Exp 21; **MRP5**). This allows to find the right successor (whether an internal or external) in time. Furthermore, an IS should determine the domino reaction for each internal successor (**MRP6**) within a succession plan and display it (**MRP7**) to

[1] General requirements like usability or security aspects are not considered in this analysis, since they are not specific to succession management systems.

support decision-making (e. g. to examine whether a successor for each position that is affected by the domino reaction, can be found; Exp 12, 19).

Since both tasks contain primarily personal data, the access has to be restricted to authorized managers and HR professionals (Exp 3, 19). Moreover, the access to succession related information for this user groups has to be restricted to their own areas (Exp 24; **MRP8**). Finally, we combined the theoretical and practical requirements to meta-requirements. Table 3 summarizes the result and shows exemplarily quotes.

Task	Meta-Requirement	Exemplarily Quotes
Succession planning	**MR1.** Possibility to match employee and position for the creation of succession plans *[MRT1 and MRP1]*	„You should be able to enter: what are the requirements of key positions and where are these positions. That should be connected with an organization chart and perhaps employee related information like competences." (Exp 16)
		„From the beginning: Succession planning, trigger of certain measures in order to develop the competences of employees, and domino reactions." (Exp 19)
	MR2. Distribution of information regarding the development of succession candidates based on succession plans *[MRT2 and MRP4]*	„And I need support through the system, so that changes within succession plans during conferences trigger the necessary workflow for the development of the succession candidates." (Exp 20)
	MR3. Availability of employee information (master data, competences, potential rating) and position requirements *[MRP2]*	„Connected systems, so that you can access information very fast, which are collected in other processes so that this information is always up-to-date." (Exp 14)
		„It must be integrated with our master data system, so that we don't have to maintain our data manually." (Exp 21)
	MR4. Possibility to display the succession plan within an organization chart *[MRP3]*	„We need another form of visualization of the succession plans rather than lists, because this form doesn't support ease-of-use." (Exp 3)
		„The graphical component is crucial, since we want to use the system in order to present information to managers and the executive board." (Exp 9)
Execution of succession	**MR5.** Possibility to process succession plans to determine domino reactions *[MRT3 and MRP6]*	„From the beginning: Succession planning, trigger of certain measures in order to develop the competences of employees, and domino reactions." (Exp 19)
	MR6. Distribution of information regarding conceivable vacancies to responsible actors *[MRP5]*	„The information in a HR master data system should also be used to make deductions regarding succession management." (Exp 21)
	MR7. Possibility to represent domino reactions graphically *[MRP7]*	„Visualization is very important, e. g. an organization chart with possible successors and possible domino reactions." (Exp 19)
Both	**MR8.** Accessibility of succession management information and functionalities within their own area for managers and HR professionals *[MRP8]*	„Due to the different user groups of managers and HR professionals the access should be restrict, so that data privacy restrictions are ensured." (Exp 19)
		„Information access should be restricted according to work areas, so that not everybody can see everything." (Exp 24)

Table 3. Meta-requirements for succession management systems

4.3 Design Principles for Succession Management Systems

Subsequently, we combine the identified meta-requirements to develop design principles for succession management systems. Thereby, our design principles focus on conditions, where the collection of the needed information for succession management is complex and thus causes great costs. In addition, we presume, that a competence management exists with a connected competence catalog and its relation to employees (possessed competences) and positions (required competences). Furthermore, we develop testable design hypotheses which are used in the following to "verify whether [the] meta-design satisfies the meta-requirements" (Walls *et al.*, 1992). Table 4 depicts the design principles and corresponding testable design hypotheses.

Design principles and testable design hypotheses
DP1. Provide functionalities to suggest successors based on a matching of employee characteristics (competencies, performance information, potential rating, and professional experience) and position requirements regarding these characteristics. Furthermore, functionalities to edit succession plans, and determine the domino reaction based on succession plans for every potential successor are required. ***[MR1 and MR5]***
H1: *Functionalities for succession planning and execution of succession provide decision relevant information and thus increase the quality of succession decisions.*
DP2. Provide system controlled triggers for the immediate distribution of information to managers and HR professionals when a vacancy is conceivable (to start the succession execution) and specified succession plan (to start the development of the successors), so that a subsequent workflow can be started. ***[MR2 an MR6]***
H2: *Functionalities for system controlled triggers decrease reaction times of process participants and thus increases the efficiency of the succession management process.*
DP3. Provide interfaces to the HR master data, competence management, performance management, and learning management system for the exchange of employee (employee master data, competences, performance information, and potential rating) and position (position requirements and organizational structure) related information. ***[MR3]***
H3: *Interfaces to other data-leading HR systems decrease the manual effort for data collection within succession management and thus improve the succession management process efficiency.*
DP4. Provide an organization chart, in which the succession plan for every relevant position is displayed, so that the status of the succession plan and the affiliation of the position in the organizational structure are clearly recognizable. Moreover the domino reaction for a selected position must be visualized, so that the affected positions with their succession plans are displayed. Within both, the representation of matching results should be supported with adequate symbols or colors. ***[MR4 and MR7]***
H4: *Visualizations of decision relevant information increases the ease-of-use and thus the efficiency of decision-making within succession management.*
DP5. Provide functionalities so that managers and HR professionals can access the functionalities succession planning and simulation and the resulting succession information only for positions in their own area of responsibility (Exception: Employee information from suggested succession candidates from other areas). ***[MR8]***
H5: *Functionalities for rights within roles increase the quantity of users, which can access the system, and thus increase the efficiency within the succession management process while ensuring data privacy.*

Table 4. Design principles and testable hypotheses for succession management systems

In the following we explain, how efficiency and effectiveness of both, a succession management system and the underlying process are affected by our design principles.

To ensure the support of the main tasks succession planning and succession execution, **DP1** comprises functionalities for the complex tasks of finding successors and simulating succession execution (Rothwell, 2010). In addition, functionalities to edit succession plans (due to decisions in manager

meetings) and to reveal the domino reaction (before a succession decision is made) should be included, so that effects of an internal succession regarding other positions can be considered in the decision. Thus, due to the availability of more decision relevant information the quality of decisions can be improved, which increases the effectiveness of the process. In order to further increase the efficiency, **DP2** aims at the reduction of reaction times within the succession management process by triggering the distribution of information automatically, if predetermined events like the specification of succession plans (trigger the development of employees) or conceivable vacancies (trigger the execution of succession) occur. Since much employee and position related information already exists within the different organizational HRIS (see section 4.2), a succession management system should provide interfaces to HR master data, competence management and performance management systems (**DP3**) to gather the required information. Thus, the effort for the manual collection of information can be avoided, which improves process efficiency. Since a huge amount of employee and position related information is needed to make decisions about succession plans or concrete successors, a succession management system must entail an appropriate visualization of this information that doesn't overexert the users. Thus **DP4** aims to support the efficiency of decision-making by visualizing the information in a way, in which the content is supported by the graphical representation. Since the access to information is restricted based on rights and roles (**DP5**) more users can access the system without ignoring data privacy concerns. Thus, users can gather required information on their own which increases process efficiency. However, since organizations don't want, that managers and HR professionals can see employee and succession related information of all areas of the organization (see section 4.2), the access for managers and HR professionals must be restricted to their own area of responsibility. An exception to this the restriction is only made, when the IS suggests an employee from another area as a potential successor, so that all required information can be accessed by the manager who is responsible for the position.

5 Instantiation: Re.org

5.1 Instance Development

In order to create an instance of a succession management system, we develop a first mockup design (see Figure 3 for exemplary screenshots) of the succession management system "Re.org", which build a basis for an actual implementation.

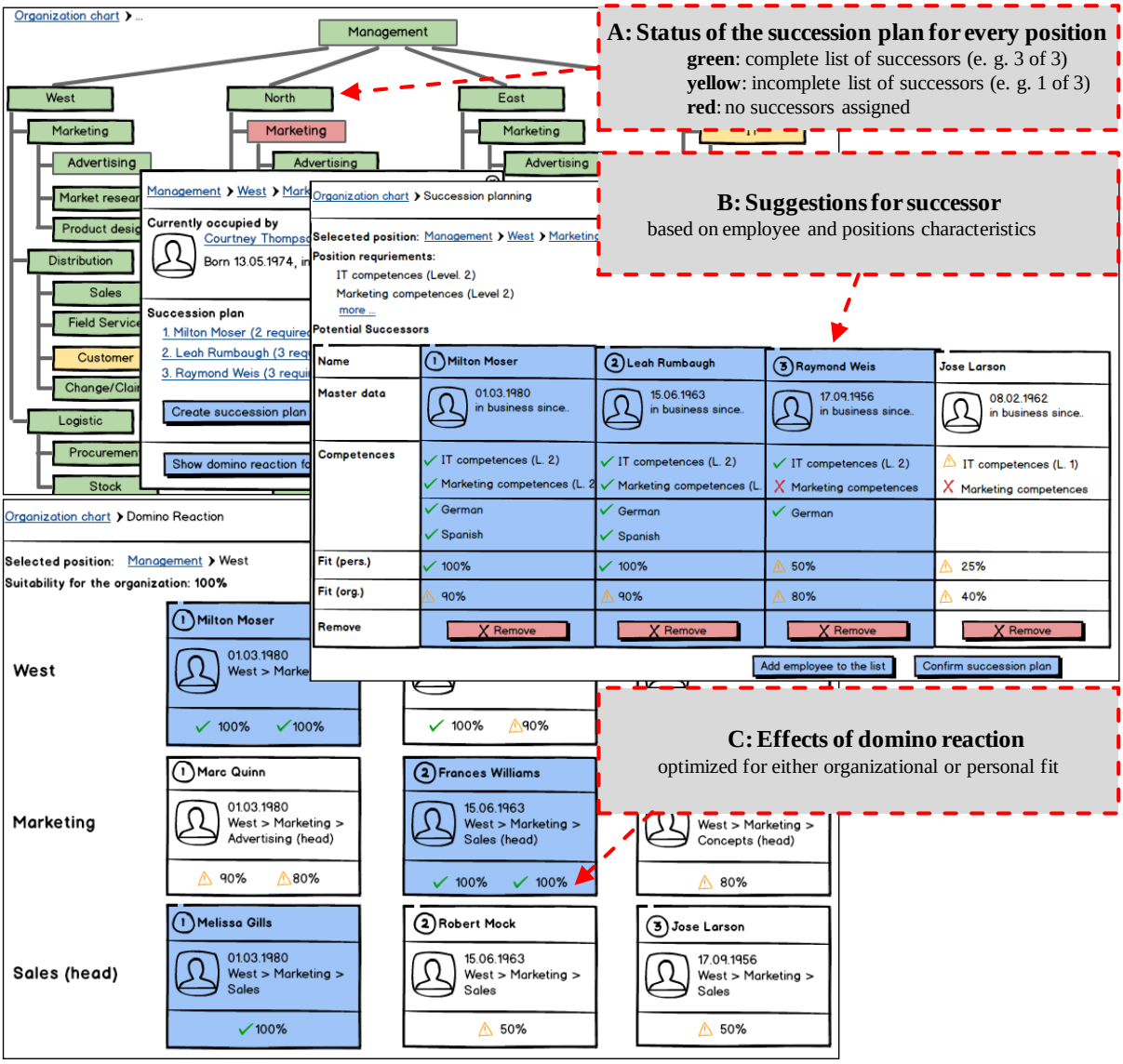

Figure 3. Mockups of the succession management system

The concrete design decisions are based on the design principles we developed in the previous section. Furthermore, we use the data from the interviews (see section 4.2) to justify our design decisions.

The starting point of our instance is the organization chart (Figure 3, **A**), which visualizes the status of succession planning for each position (**DP4**). We decided to use an organization chart instead of other visualization forms (e. g. lists) because it is more comprehensible (Exp 3, 20). By selecting a position in the chart, a popup opens that displays position related information like the position holder. In this window, the planning (e. g. finding potential successors through matching) and simulation functionalities can be accessed.

As demanded by **DP1**, the instance will include functionalities to provide suggestions regarding potential successors based on a matching of employee competences and position requirements (Exp 16, 19) while ensuring, that every employee can only be in three succession plans (Exp 15). Figure 3 (**B**) displays a list of potential successors that can be compared based on their individual characteristics. Besides the suggestions that are made by the IS, the user is able to manually add other employees to the generated list. In addition, the instance will contain functionalities to identify domino reactions to support the execution of succession (succession simulation; Exp 21). These reactions are visualized (**DP4**) throughout the organizational hierarchy as depicted in Figure 3 (**C**). Thereby, the

organizational hierarchy is displayed in rows and possible successors are displayed for each position. The currently selected successor is marked (blue color) and can be either suggested by the IS or selected by the user. The suggestions within the domino reaction can be created based on personal fit (assign the employees that fulfill position requirements best) or organizational fit (assign employees that maximize the average requirements fulfillment across all hierarchy levels).

In order to enable system controlled triggers within succession planning (**DP2**), the instance will initiate competence development measures based on the succession plans and trigger the succession execution, if a vacancy is conceivable (Exp 1, 20). Moreover, we decided to use interfaces (**DP3**) to reduce manual input effort and to ensure that the required information is always up-to-date (Exp 14). As to this, the instance will provide interfaces to the HR master data system and competence management system, so that the required employee and position related information is available (Exp 2, 9, 21). Furthermore, functionalities for rights (**DP5**) are supposed to ensure that the authorized managers and HR professionals can access the employee and succession related information and functionalities for succession planning and simulation only within their own area (Exp 3, 10, 19). An exception to this restriction is only made, if a potential successor from another area is suggested by the system.

5.2 Instance Evaluation

In order to rigorously demonstrate the utility of the developed instance (Hevner *et al.*, 2004; Stufflebeam, 2000), we conducted another semi-structured interview study (explanatory) with seven participants from the first interviews (Exp 1, 2, 6, 10, 20, 23, 24; see section 4.2). Thereby, we decided to evaluate the instance with the same group of participants, since they are experts in the field of succession management. The interviews were conducted in January 2014 and lasted from 20 to 30 minutes each. To ensure the gathering of substantial feedback regarding the design of the instance, we structured this discussion according to the above formulated design principles.

Concerning **DP1**, the evaluation of our instance shows, that the provided functionalities support the succession management process: Through the matching functionalities more suggestions regarding potential successors are available (Exp 10, 24) and every manager can quickly review the capabilities of each potential successor (Exp 1, 2). Similarly, the simulation of the domino reaction supports the execution of successions, since the effects of a succession decision can be easily conceived (Exp 1, 20). Hence, we assume that these functionalities can provide a decision support and due to more available information for decision-making, the quality of decisions will be increased (Exp 1, 10, 20, 24).

For our instance, we suggested system controlled triggers to automatically distribute information to the process participants (**DP2**). According to the interviews, this functionality is necessary whether it provides a task assignment or just a notification (Exp 2), since subsequent tasks like choosing a successor from the succession plan can be started immediately (Exp 10, 24). Thus, we suppose that reaction times can be reduced and process efficiency can be increased (Exp 2).

As a result, the evaluation reveals that interfaces (**DP3**) to the HR master data system, competence management system, performance management system, and learning management system are necessary as information from these systems is used during the matching process (Exp 1, 2, 10 , 20). Due to these interfaces, manual effort can be reduced, since the manual collection of required information from different systems can be avoided (Exp 2, 10, 23, 24). The visualizations of the status of each succession plan and the domino reaction (**DP4**) is preferred over other visualization forms since the decision relevant information is highlighted (Exp 1, 2, 10, 23). Thereby, the visualization of the status of succession plans (green/yellow/red) contributes to an intuitively and easy usage, since this color scheme is widely used in other areas of everyday life (e. g. traffic lights) (Exp 1, 10, 20). Furthermore, the illustration of the domino reaction was considered to be helpful for identifying further need for action that can result from a succession decision (Exp 1). Only the depiction of the

organization chart was criticized since it contains too many positions, which decreases the clarity (Exp 10, 23).

In addition, the evaluation shows that the classification of HR professionals and managers into two different roles with different rights (**DP5**) is sufficient (Exp 1, 2, 10, 23). In addition, since Managers and HR professionals can only view their own area of responsibility and successors, which are suggested by the system, data privacy can be ensured (Exp 1, 23). Altogether, if all process participants can access the system and use it for their tasks, the process efficiency can be enhanced (Exp 1).

Table 5 shows exemplary quotes from the interviews that support our design hypotheses from section 4.3. As we conducted a qualitative study with a relatively small sample, we are not able to make statistically reliable statements about whether some of our hypotheses must be refused or not. However, the results of a qualitative study can support our assumptions and thus give a hint on their reliability (Yin, 2009).

Design hypotheses and exemplarily Quotes	
H1	Functionalities for succession planning and execution of succession provide decision relevant information and thus increase the quality of succession decisions.
	„According to our experience, the benefit is higher with more candidates to select from, because you have a better basis for decision-making." (Exp 1)
	„The functions for succession planning and simulation would support us in our process, so it would be a good decision support because several candidates will be displayed and you can choose the most appropriate candidate." (Exp 10)
H2	Functionalities for system controlled triggers decrease reaction times of process participants and thus increases the efficiency of the succession management process.
	„Something like this would be very helpful to pass information quickly to the appropriate users."(Exp 24)
	„Information that a position becomes available would help to focus quickly on succession for positions that are currently relevant." (Exp 20)
H3	Interfaces to other data-leading HR systems decrease the manual effort for data collection within succession management and thus improve the succession management process efficiency.
	„Due to the huge amount of information, there must be interfaces. Otherwise far too much effort is created to maintain the information manually." (Exp 2)
	„We need up-to-date information. Thus we need interfaces to share the information e. g. about employee competences between different HRIS." (Exp 24)
H4	Visualizations of decision relevant information increases the ease-of-use and thus the efficiency of decision-making within succession management.
	„The visualization of the status of the succession plan is good, because the colors of traffic lights are used and thus the meaning is easy to understand." (Exp 1)
	„Through this visualization of the domino reaction, the effects of a succession decision are easily comprehensible." (Exp 1)
H5	Functionalities for rights within roles increase the quantity of users, which can access the system, and thus increase the efficiency within the succession management process while ensuring data privacy.
	„You have to give access to all [process] participants and thereby so much rights so that they can perform their tasks efficiently." (Exp 1)

Table 5. Results of the instance evaluation

6 Discussion

The evaluation provides first evidence regarding the reliability of our design principals and hypotheses. Based on the results of this evaluation, only design principle four must be revised. This principle needs further specification in order to ensure comprehensibility concerning the amount of information within the organization chart. Hence, the status of succession planning should be displayed divided into different hierarchy levels (e. g. middle and top management; Exp 10, 23).

However, we are aware that the presented research has some limitations. First, our developed design principles are exposed with a limited generalizability, since we only interviewed German experts. Due to different legal requirements in other countries (e. g. regarding data privacy) it should be examined in further research, if these design principles can also be applied to organizations in other countries. Second, we only developed a first mockup design and not an actual implementation. Moreover, we only conduct a qualitative evaluation with a small sample and interviewed the same experts for deducing and evaluating the design principles. Hence, we are currently implementing a prototype, which is based on the revised design principles. Subsequently, we plan a more extensive empirical evaluation with other organizations and experts, to gather more insights to justify our design principles.

7 Conclusion

In this paper, we presented a set of design principles for IS that increase the efficiency and effectiveness within the succession management process. The principles were derived from meta-requirements, which emerged from both, theory (using principal-agent theory as kernel theory Walls *et al.*, 1992) and practice (using an interview study among 21 organizations). Subsequently, we tested the design principles by implementing them in an instance and conducting an empirical evaluation among seven organizations. The results of the evaluation were used to revise the design principles. Our research has emphasized a domain that is highly relevant for the competitiveness of organizations, especially in times of declining quantitative and qualitative labour supply (war for talents). Thereby, our results are a contribution for both, researchers and practitioners: We expand the existing knowledge base by providing meta-requirements and design principles for succession management systems based on expert knowledge and well-known theories. In addition, our design principles can be used as guidance for practitioners to develop succession management systems in order to increase the efficiency and effectiveness of succession decisions.

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