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ORIGINAL ARTICLE

A framework for nurturing champions of digital innovation

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Abstract

Information Systems (IS) champions enthusiastically promote a digital innovation project throughout its development by obtaining the necessary resources. These individuals shape the innovativeness of an organization, as they initiate digital innovation projects and lead them toward successful completion. We still know little about how these champions can be identified and nurtured in organizations. We follow the Design Science Research approach in developing a framework for nurturing IS champions that can guide human resource practitioners. Our framework offers a strategic view of the champion journey and prescribes recommendations for action. The design decisions were derived from literature on digital innovation and innovation champions, and the framework was subsequently refined and evaluated meticulously. The design underwent two stages based on expert interviews from the IT industry (formative evaluation) and was subsequently evaluated by experts in digital innovation project management and human resource development in the IT industry (summative evaluation). The results demonstrate the feasibility of the framework and offer further insights into the problem and solution space of nurturing IS champions.

Keywords IS champion · Digital innovation · Champion nurturing framework · Design science research

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1 Introduction

The rise of digital technologies in recent years has significantly increased the importance of promoting digital innovation in organizations (e.g., Fichman et al. 2014; Müller et al. 2019; von Briel et al. 2021). In digital innovation, "digital technologies and associated digitizing processes form an innate part of the new idea and/or its development, diffusion, or assimilation" (Nambisan 2017, p. 224). The most notable characteristic of digital innovation is the democratization of agency (Fichman et al. 2014; Opland et al. 2020), as evident in employee-driven digital innovation projects. When initiated by employees, a digital innovation initiative is more likely to lead to a persistent competitive advantage (Thompson et al. 2020; Yan et al. 2018).

The initiators of such employee-driven innovation are known as information systems (IS) champions, individual actors who enthusiastically acquire the required resources to promote a digital innovation project and shape the innovation's design (Renken and Heeks 2019). Since champions often work behind closed doors, high-profile examples are hard to find. However, one famous example involves several champions who persistently worked on the development and promotion of laptops at Toshiba in an under-the-table project that was opposed by headquarters but ultimately led to a worldwide success for Toshiba (Abetti 1997). More recent documented examples include the development of an information system in the healthcare sector through collective social interactions to recruit team members, develop a participatory structure, and gain and maintain support from decision makers (van Laere and Aggestam 2015). IS champions are highly influential not only at the beginning of a project (Howell et al. 2005; Maidique 1980; Renken and Heeks 2019; Drechsler et al. 2021), but also in determining the project's success (Dong et al. 2007; Howell and Shea 2001; Markham and Griffin 1998). Given these benefits, we expect organizations to be particularly interested in identifying potential IS champions among all employees and promoting their development with suitable measures. IT workforce and organizational vision alignment have indeed a long tradition in IS research (Gélinas et al. 2022; Johnson et al. 2016; Niederman et al. 1991; Roepke et al. 2000).

Despite innovation champions' importance, literature on how to nurture the emergence of IS champions is scarce (Renken and Heeks 2019). Most prior works assume that individuals predisposed with certain individual characteristics spontaneously emerge as champions, if the right conditions prevail in an organization (Howell and Higgins 1990; Markham 2000). On the other hand, some other works follow the nurture view and recommend managers to actively nurture champions (Howell et al. 2005). However, evaluated guidelines on how IS champions can be nurtured are rare. This paper responds to calls to provide practice with guidance on how to nurture IS champions (Renken and Heeks 2019) by extending the current knowledge base on developmental measures (e.g., Bertels et al. 2020; Howell and Higgins 1990). Thus, the paper examines the following research question: *How can IS champions be nurtured within an organization?*

In answering this research question, this paper conceptualizes and evaluates a framework for nurturing IS champions by following a Design Science Research (DSR)

approach. The DSR process proposed by Peffers et al. (2007) guides this research. The results of a literature review provide the theoretical foundation. Following the proof-of-concept research stage (Nunamaker et al. 2015) and the Framework for Evaluation in Design Science (FEDS) (Venable et al. 2016), experts, predominantly from the IT industry, evaluated the designed artifact through interviews. In doing so, this paper addresses "design and action" as an underrepresented type of theory (Gregor 2006) in this research area (Renken and Heeks 2019).

This paper contributes to IS research in four ways. First, we extend the knowledge base on IS champions' emergence through a framework as the design artifact. Second, we provide insights into the problem and solution space of nurturing IS champions, as designers of digital technology, and the feasibility of such an approach for providing design knowledge. Third, we extend the research stream on IT workforce alignment (Roepke et al. 2000) to consider the possibility of nurturing the potential of the IT workforce for championing digital innovation. Finally, we present potential instantiations of our framework in established human resource management systems (Arthur 1994; DeSanctis 1986; Saks 2022) as well as standalone IS applications.

The following section provides the theoretical background. Thereafter, the research method is described in detail. This is followed by an introduction to the designed framework and a description of the framework's three evaluation episodes. The paper closes with a discussion of the findings and a conclusion.

2 Theoretical background

2.1 Defining IS champions

Innovating involves opportunity recognition (Hayton and Kelley 2006), arising from information asymmetry in society (Shane 2000). However, "[no] ordinary involvement with a new idea provides the energy required to cope with the … resistance … [to] change" (Schon 1963, p. 84) that innovation brings. Schon (1963) identified innovation champions as essential to that opportunity. The importance of innovation has also been acknowledged in IS research, coining the notion of "IS champion" as a nod to the role of these champions in IS innovation or digital innovation. The IS champion is an individual or group of individuals "who [make] a decisive contribution to the socio-technical innovation by actively and enthusiastically promoting its progress through critical innovation and diffusion stages to obtain resources and active support from all stakeholders" (Renken and Heeks 2019, p. 835).

Champions promote an innovation project in several ways. Besides resource acquisition (Jenssen and Jørgensen 2004), their activities include idea selection and promotion (Schon 1963), motivation of the team (Howell and Shea 2006), visioning and inspiration of others (Howell and Higgins 1990), knowledge transfer (Drechsler et al. 2021), as well as networking and the involvement of other people (Howell and Shea 2006). Champions are creative in transforming an idea into a prototype, enthusiastic about new technology, and confident (Howell et al. 2005; Hayton and Kelly 2006). They approach the projects in a risk-taking, persistent, proactive, and optimistic manner (Reibenspiess et al. 2018; Howell and Shea 2001; Roure 2001).

Skills include supportiveness, innovativeness, networking, social skills, and transformational leadership (Reibenspiess et al. 2018; Howell et al. 2005; Jenssen and Jørgensen 2004). In addition, champions need technical, business, industry-specific, and organizational knowledge (Howell and Shea 2001; Hayton and Kelly 2006; Roure 2001) and diverse career experience (Renken and Heeks 2019). Studies indicate that individuals taking up the role of innovation champion fall within a spectrum by fulfilling the characteristics and activities of champions to a degree (Howell and Shea 2001; Walter et al. 2011).

Extant literature is characterized by an ongoing discussion on champions' predisposition, appointment, and development (Renken and Heeks 2019). Several studies found champions emerging from specific roles or positions (Dong et al. 2007; Esteves and Pastor 2002), while others argue that an appointment to the role might undermine champions' motivation (Howell and Higgins 1990). Additionally, several studies have described innovation champions' traits (e.g., Hayton and Kelley 2006; Roure 2001). Thus, Howell and Higgins (1990) describe how particular personality traits predispose champions' emergence, but also suggest that transformational leadership training can nurture champions. Other researchers suggest that innovation champions can be nurtured by offering incubator services combined with freely available resources (Beath 1991), or through engagement on a platform promoting employee-driven innovation (Reibenspiess et al., 2022). Additionally, van Laere and Aggestam (2015) found that champions learn from prior experiences and adapt their behavior. In this way, champions may nurture themselves through future projects. Yet, how organizations can set up training programs for champions remains an unanswered question (Renken and Heeks 2019).

2.2 IS champion as IT workforce for digital innovation

We consider IS champions as members of the larger IT workforce. IS research on the IT workforce has a long history which can be divided into three waves (Wiesche et al. 2020): IT as a new profession, IT as a strategic resource, and new forms of IT organizations. This paper is particularly concerned with the new forms of IT organizations. Aligning the IT workforce and organizational vision has long been a focus of IS research (Roepke et al. 2000). On the one hand, digital technologies have become enablers of new ways of working, and these were recently prompted for pandemic containment (Zamani and Spanaki 2023). On the other hand, these new forms of organizations tend to distribute leadership or even become leaderless (Zhang and Faerman 2007). This has implications for the role of IS champions in driving innovation initiatives. Championing innovation initiatives is no longer a de facto role of leaders. Instead, any employee can become an IS champion.

In the last decades, the development of new technologies has been closely intertwined with the transformation of the IT workforce, which has also been referred to as co-evolution (Niederman et al. 2016). Following this development, the latest technological changes, such as the increasing prominence of digital technologies, have brought about significant changes to the IT workforce. The emergence of digital technology has had a profound impact on the nature of digital

innovation and the innovation process (e.g., Buck et al. 2022; Fichman et al. 2014; Yoo et al. 2010), which in turn affects innovation agency and champions. In the realm of digital innovation, new ideas, and approaches emerge from the integration of previously disconnected knowledge elements originating from diverse industries (Barrett et al. 2012; Yoo et al. 2012), and are brought to fruition through the collaboration of frequently changing associations of various actors (Nambisan et al. 2017). This is facilitated by the new layered modular architecture of digital innovation, which offers almost unlimited opportunities for recombining existing physical and digital components to produce novel products and services (Yoo et al. 2010). Furthermore, digital technologies are subject to constant and spontaneous change, a phenomenon described as the generativity of digital innovation (Yoo et al. 2012; Zittrain 2006). These developments underscore the critical role of innovation champions in directing and managing the rapidly evolving development processes of digital innovation. Distributed teams of IS champions can play a significant role in orchestrating and promoting these spontaneously changing development processes (van Laere and Aggestam 2015; Negoita et al. 2022), highlighting the importance of champions in promoting digital innovation projects throughout their development stages.

As members of the IT workforce, IS champions can benefit from targeted human resource management (HRM) practices. Issues related to career development, governance, and organizational policy (including HRM policy) are parts of the repertoire in IT workforce research (Wiesche, et al. 2020). Organizational culture and structure influence the IT workforce (Jenkin et al. 2019; Kaarst-Brown et al. 2019; Maruping et al. 2019), and we expect them to promote the journey of becoming IS champions. The challenge is how to identify the potential of IS champion behavior in employees and then nurture and actualize this potential (Renken and Heeks 2019). We address this challenge by viewing it as a sociotechnical endeavor.

2.3 Nurturing IS champions as a sociotechnical endeavor

IS champions act within the organizational context and interact with other champions, employees, and stakeholders. This demands a consideration of the champion's environment (e.g., organizational culture, structure, and policy) in studying the IS champion's journey. The socio-technical systems (STS) theory provides a theoretical lens to view the IS champion as part of a greater whole (Lyytinen and Newman 2008; Seidel et al. 2013). More importantly, the sociotechnical perspective is one of the most important "axis of cohesion" in IS research as the community grows and expands its boundaries (Sarker, et al. 2019).

The STS theory describes an organization as the composition of four interacting components: technology, structure, task, and actor (Leavitt 1964). These components are attributed to two independent but interrelated subsystems: the social subsystem – encompassing structure and actor – and the technical one – containing technology and task. The system's output results from the interactions of both subsystems (Bostrom and Heinen 1977) that must be harmonized to form an ideal system (Bostrom and Heinen 1977; Lyytinen and Newman 2008).

The socio-technical model can refer to different levels of an organization (Lyytinen and Newman 2008). In this paper, it was adapted to the nurturing of IS champions. Figure 1 shows the nurturing of IS champions through the lens of STS theory.

The *structure* component encompasses the organizational structure, including rights, control, formality, geographical dispersion, culture, project management frameworks, and communication channels (Lyytinen and Newman 2008). Thereby, it encompasses the organizational environment characteristics that enable nurturing. The *actor* component includes the individual's characteristics (Lyytinen and Newman 2008). It contains the IS champion's skills, knowledge, and traits.

The *technology* component refers to all elements of the organization's technological core (Lyytinen and Newman 2008). Considering IS champions and their nurturing, this component refers to technological tools supporting the organization in identifying, developing, and reinforcing the IS champion. The *task* component describes the raison d'être (Leavitt 1964) and the meeting of stakeholders' requirements (Lyytinen and Newman 2008). In this paper, this is understood to illustrate the interactions of and with the IS champion as well as the measures that trigger these interactions.

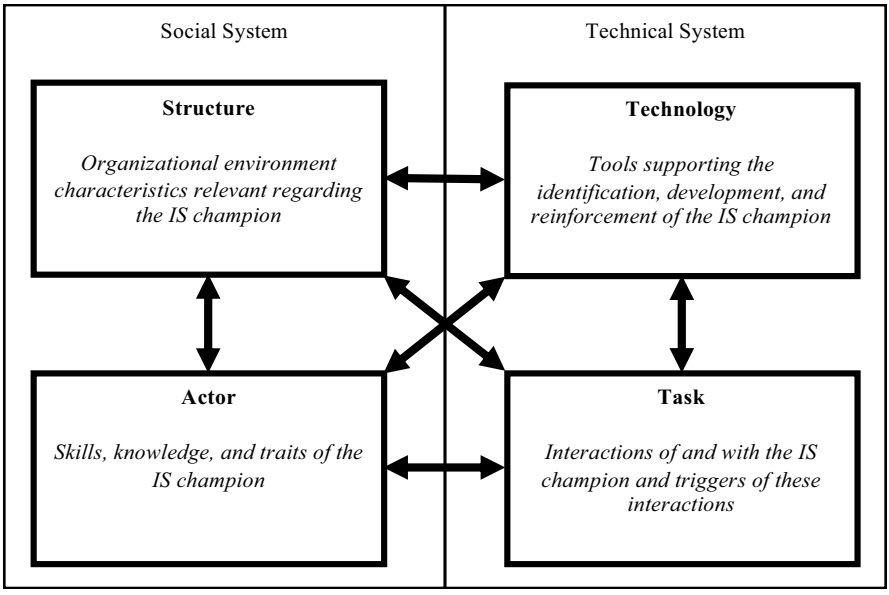

Fig. 1 The Socio-Technical Model for Nurturing IS Champions (adapted from Lyytinen & Newman (2008) and Bostrom & Heinen (1977))

3 Research method

3.1 Design science research procedure

We follow the DSR paradigm to design the framework for nurturing IS champions. DSR is embedded between the environment and the knowledge base (Hevner et al. 2004; Simon 1996). The environment contributes to the relevance of an existing problem (Hevner et al. 2004; Simon 1996), and the knowledge base supports rigor (Hevner et al. 2004). This research is structured according to the process proposed by Peffers et al. (2007), consisting of four phases and two design stages. The process begins with understanding the problem and solution objective to guide, delineate, and justify the artifact creation. Through the design and development phase, the existing knowledge enriched by creativity is translated into an artifact. The demonstration and evaluation phase show the feasibility and contribution to the solution objective. Figure 2 shows the application of the process in this research. We further depict a possible third design stage, where a field study could provide a real-world application and evaluation of the artifact and enable further refinement of the framework in the future.

3.2 Problem definition and solution objectives

The problem definition for this study arose through observations in earlier research projects in large incumbent firms. These organizations aim to promote digital innovation to stay competitive in an increasingly digital world. However, identifying potential champions of innovation within the workforce can be challenging, as these individuals may not hold traditional roles associated with innovation. Our observations revealed that in some settings, IS champions may be easily identifiable, while in others, they are inconspicuous or underestimated employees whose brilliant innovative ideas and efforts may only become evident when the problem they strive to address becomes too urgent to ignore. Additionally, organizations may lack the necessary measures to support and facilitate the skill development of these employees, even when they are identified. While innovation champions are generally valued by organizations, organizations may not possess the knowledge, processes, and tools to support and train them adequately. Thus, we observe the need for a hands-on framework to support human resource professionals in nurturing IS champions, identifying and supporting the achievement of their full potential.

Figure 3 portrays our design theorizing with regard to problem definition and solution objectives (see Sect. 1 and Sect. 2.2 for elaboration). The figure differentiates between abstract problem–solution and instance problem–solution. In the abstract domain, organizations can seize opportunities by adopting new ways of working, such as leaderless teams, and novel innovation approaches, such as employee-driven innovation.

However, these opportunities present challenges, particularly in harnessing such innovation approaches to promote growth and competitiveness. To address these

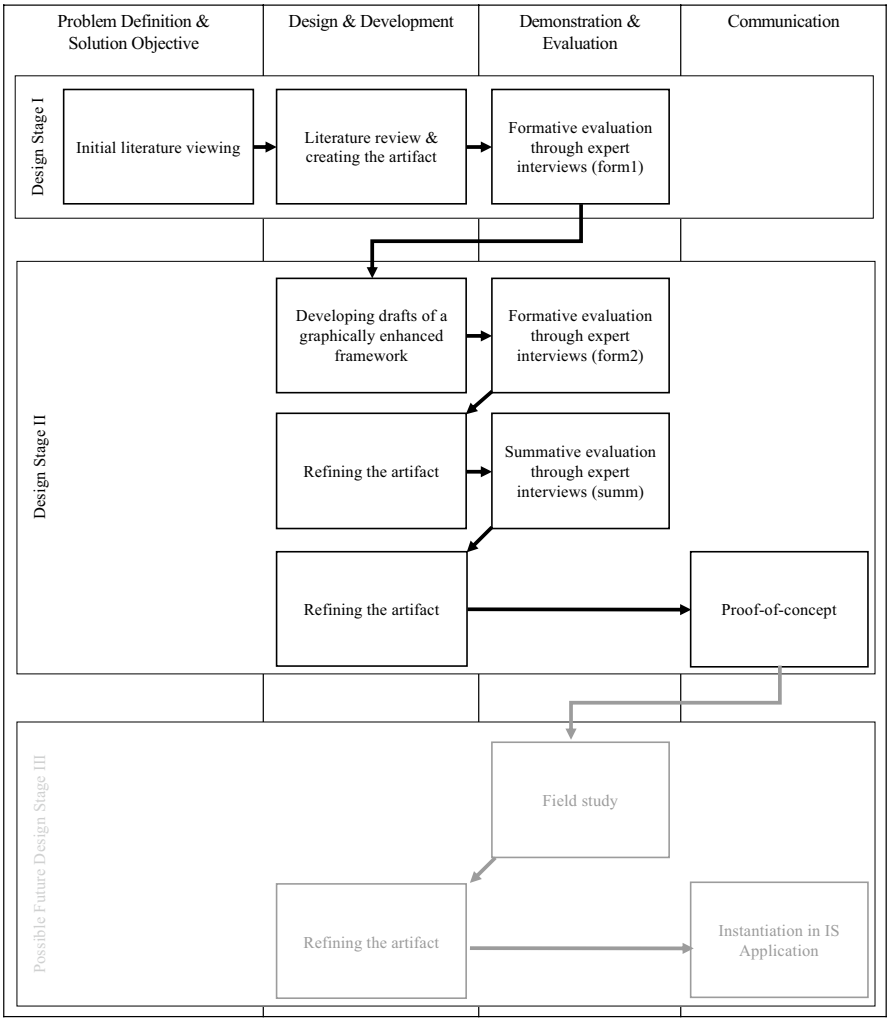

Fig. 2 Our DSR Process (adapted from Peffers et al. (2007))

challenges, new theories, methods, and tools are needed. In the instance domain, one specific opportunity for organizations is the identification and nurturing of potential IS champions as important members of the IT workforce. However, practical guidance is necessary for organizations to implement the nurturing and harnessing of champions effectively, such as the development of a framework for nurturing IS champions.

The anecdotal descriptions presented above, in conjunction with Fig. 3, demonstrate that the problem addressed in this study is one that companies striving to develop digital technologies and promote innovation face in various forms. As Sect. 2.2 highlights, developing champion behavior is not limited to exceptional

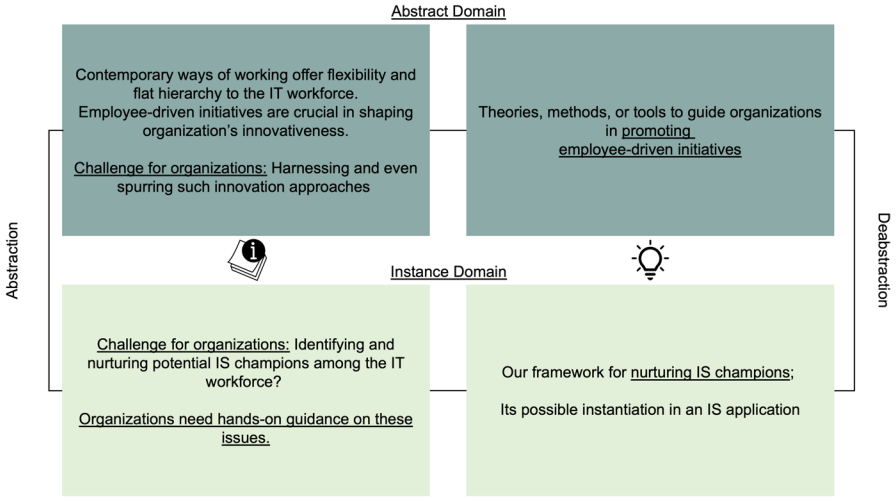

Fig. 3 Our Design Theorizing (adopted from Lee et al. (2011))

individuals but involves promoting champion behavior across all employees in the digital age. However, it is evident that certain organizational conditions, such as a low to medium degree of hierarchical organization, a medium to high degree of freedom for individual employees, and an innovation-promoting culture, serve as the foundation for addressing this problem. Thus, organizations lacking these conditions or not seeking to develop digital innovation may not enable the successful implementation of the proposed framework.

Our solution objectives are to provide (1) a theory and evidence-based framework for nurturing IS champions to support human resource professionals in identifying and developing their full potential and (2) application flexibility to cater to the situational needs of every organization. Consequently, the framework is not designed to provide immediate solutions; rather, it enables companies to implement measures over the medium and long term, thereby integrating nurturing into their organizational identity. In addition, it offers the possibility of further research or practice to address individual problems of the class of problems in a structured way.

3.3 Design and development

Current literature faces two main issues concerning nurturing IS champions. First, the research on nurturing IS champions is twofold: one research stream sees champions as predisposed (nature view), and the other research stream considers champions to evolve through appointment or training (nurture view) (Renken and Heeks 2019). Second, the latter stream of the literature has extensively characterized champions and, for instance, emphasized their creativity, enthusiasm, and high networking skills and identified organizational characteristics enabling champions, such as low levels of centralization and performance-based performance appraisal (Reibenspiess et al. 2018). Yet, the literature hardly offers guidance on how to

promote these characteristics among employees to increase championing behavior. These issues in the knowledge base leave practice without guidance. Renken and Heeks (2019) propose unifying the IS champion's characteristics to derive practical implications. Following the approach by Hayton and Kelley (2006) to unify the discussion on "nature versus nurture" by summarizing characteristics into traits, skills, and knowledge, we argue that IS champions can be nurtured to a certain degree. Accordingly, this first step of the DSR approach was centered on reviewing current literature surrounding the individual and organizational characteristics promoting IS champions, since they could be used as a starting point for nurturing IS champions.

Two recent literature reviews meet the goal of identifying the characteristics of IS champions and their development. We used these reviews as a starting point for our literature analysis and complemented the relevant literature using two different search techniques. First, a backward search (Webster and Watson 2002) extracted and deepened the findings of the current literature reviews by Reibenspiess et al. (2018) and Renken and Heeks (2019). Second, a keyword search according to vom Brocke et al. (2009), collected articles published after the search period covered by these two reviews and additionally covered articles on digital innovation characteristics. The keyword search relied on a similar approach as the two existing literature reviews, as it was aimed at complementing them with more recent literature. The search was conducted using EBSCO Business Source Premier and searching journals ranked as A + to B in the VHB-JOURQUAL3 for Information Systems (Hennig-Thurau and Sattler 2015) relying on a combination of keywords such as "IS champion" and "digital innovation".[1] Subsequently, the identified literature was filtered based on whether it explicitly covered digital innovation characteristics and/or whether it included an explicit focus on innovation champions in general or in relation to digital innovation. Overall, the backward search and keyword search identified nine additional relevant papers.

The literature analysis examined insights into digital innovation characteristics, champions' characteristics and behaviors, organizational environments supporting digital innovation, champions and nurturing by both analyzing the identified sample of relevant literature and the literature analyzed in existing literature reviews. Consequently, our research benefits from engaging with prior research "to optimize the incremental accumulation of knowledge" (Renken and Heeks 2019, p. 837). The findings in existing literature were systematically extracted, analyzed using STS theory, and later used to build a first prototype of the artifact.

Based on the findings in the literature, we identified building a framework for nurturing champions as a suitable approach to address our research problem. While at first different options were considered, we decided on the framework, since it allows for a structured approach toward nurturing champions and meets the suggestion by Renken and Heeks (2019) of unifying the IS champion's characteristics to derive practical implications from it. The design research process followed established guidelines to develop an artifact (Peffers et al. 2007). However,

[1] We used broad list of keywords that also covered synonyms, such as "information system innovation", "socio-technical innovation" or "promoter".

the development process exceeds the existing knowledge base (Markus et al. 2002) and is enriched by the researcher's creativity (Hevner et al. 2004).

The initial artifact structured the findings in literature using the STS theory. Additionally, we considered two different approaches for structuring the champion nurturing process across time during the research project. First, we considered the different phases of an innovation process. However, we abandoned this approach, since the different phases could not always be clearly distinguished from each other and the digital innovation process has been described to no longer follow phases (Nambisan et al. 2017). Instead, we created the champion journey, an idea inspired by the customer journey. The customer journey is used in marketing to describe, analyze, and improve the purchase phases: pre-purchase, purchase, and post-purchase (Lemon and Verhoef 2016). Following the customer journey, the champion journey describes the points of contact between the (future) IS champion and the nurturing measures within the organization during three champion journey phases: identification (pre-development), development, and reinforcement (post-development).

The first prototype was built by relying on existing findings in literature based on the conducted literature analysis as well as using the STS theory and the champion journey (see Appendix A for details). Thus, relevant articles identified in our literature review were first coded according to whether they described characteristics of IS champions across the four elements of the STS theory: actor, task, organization, and technology. In Sect. 2.3 we outline how we used STS theory as a lens for our study in detail. For example, we considered the skills, knowledge, and characteristics of champions within the actor element, while technology encompassed all the technological tools that support the organization in identifying, developing, and empowering IS champions. In a second step, we also coded the items and identified elements according to where they fell within the champion journey: identification, development, or reinforcement. In this way, we carefully considered the context in which champions and their characteristics had been studied, in order to categorize the stage at which the findings could be used to build our framework. The findings from the literature were enriched through brainstorming sessions among the researchers, following established recommendations to rely on the creativity of the researcher (Hevner et al. 2004).

The insights gained from the two formative evaluation episodes subsequently supported the development of the artifact, first by validating and enriching the content, and second by identifying graphical options and merging them into a feasible one. While we predominantly focus on presenting the evolution of the framework in Sect. 4 and the final version in Sect. 5, a detailed account of the evolution of the framework can be found in Appendix A.

3.4 Demonstration and evaluation

The demonstration and evaluation objective, derived from the proof-of-concept stage of the "last research mile" (Nunamaker et al. 2015, p. 15), was to provide evidence of whether the artifact addressed the problems and was applicable in practice. The

Framework for Evaluation in Design Science (Venable et al. 2016) guided the evaluation strategy. Due to the scarce literature on the emergence of IS champions (Renken and Heeks 2019), two formative phases helped improve the artifact, and the final summative phase assessed the artifact to conclude this proof-of-concept research (Venable et al. 2016).

Two formative evaluations (form1 and form2), one in the first and one in the second design stage, elicited the status and collected aspects for improvement. Both evaluations started with a demonstration to gain insights into the feasibility. The first formative evaluation focused on the problem and solution space (Nunamaker et al. 2015), while the second focused on the level of detail and completeness of the framework (March and Smith 1995). The research concluded with a summative evaluation (summ) focusing on the "degree to which it is within the mental […] abilities of its intended users or participants" (Nunamaker et al. 2015, p. 15) and the potential use cases of the chosen approach.

We conducted three evaluation episodes to justify the design and prove its applicability. Leaders from organizations of varying sizes with a core business in the IT industry and digital innovation formed the sample for the non-standardized, guideline-based one-on-one expert interviews. Due to the diversity of organizations, they represent, and their varying backgrounds and roles, these experts constitute a representative cross-section of the industry. These leaders are aware of the importance of digital innovations for the organization's strategy. They contribute to the innovation process by carrying responsibility for creating an optimal environment for employees and creating both social and technical development opportunities. Each leader represents the organization where our framework can be applied. The three evaluation episodes were conducted with a slightly varying sample, as shown in Table 1.

4 The evolution of our framework

In the following, we provide detailed information on the evolution of our framework during the two design stages.

4.1 The rationale

We defined a list of requirements from the literature and our formative evaluation to guide the framework's elements and visual appearance – including its logic and structure. The following are the key points:

- IS champions can be nurtured.
- Digital innovation involves the recombination of knowledge.
- Nurturing IS champions begins with an assessment.
- Nurturing IS champions occurs in a sociotechnical context.
- The champion journey may vary across organizations. Therefore, the interventions should be tailored accordingly.

Table 1 Experts sample and attendance in the evaluation phases

ID	Industry	Organization size	Leadership role	Leadership experience (thereof in the current organization)	Evaluation episode
1	Computer software	501–1,000	People development expert	12 years (2.5 years)	formative (form)1, form2
2	Information technology & services	201–500	Team lead project management office	7 years (3 years)	form1, form2
3	Computer software	11–50	Co-founder & managing partner	9 years (7.5 years)	form1, summative (summ)
4	Information technology & services	201–500	Head of project management and customer success	8 years (1 year)	form1, summ
5	Information technology & services	201–500	Principal IT consultant	26 years (3 years)	summ
6	Hospital & health care	1,001–5,000	People development partner	1 year (1 year)	form1, summ
7	Information technology & services	51–200	Senior consultant & project lead	4 years (2 years)	summ

During our three evaluations we aimed to involve a broad selection of experts with diverging backgrounds, roles, and stemming from different organizational cultures. Consequently, we asked each expert to participate in a maximum of two out of the three evaluations. Accordingly, we recruited additional experts (Experts 5 and 7) for the summative evaluation to profit from different perspectives

These key requirements are addressed in the elements we describe in the different versions of the framework (see next subsections) and the final version (see Sect. 5.). The target users of this framework are practitioners in human resource management (HRM) and human resource development as well as line managers and upper management (see Sect. 5.3. for details). The framework can be applied at any HRM stage due to its modular design. The framework's final visual appearance and elements result from several iterations. The expert interviews informed each iteration we conducted as part of our formative evaluation.

4.2 Design stage I—Framework version for formative evaluation

Based on the findings from the literature, the first prototype of the framework was implemented. The framework consists of three types of building blocks: champion journey phases, STS components, and recommendations for action. For the first draft of the framework, a tabular representation was chosen: the three champion journey phases (*re-)identify*, *develop*, and *reinforce* as columns, the STS components as rows, and the recommendations for action (broken down into "What", "How" and exemplary measures) as the intersections. The framework's first version, which was assessed in form1, was informed by knowledge in existing literature, as outlined below. It is depicted in Fig. 4. In the following, we describe the findings in the literature we used to derive the framework. Details can be found in Appendix A. 1.

Identification Phase: To nurture champions, their identification is essential. While some studies identified the champion by job title (e.g., Esteves and Pastor 2002; Dong et al. 2007), Howell and Higgins (1990) conclude that appointing a champion can be counterproductive. Being called a "champion" can be a desirable status symbol leading to distortions in identification through self-nomination or other single nominators. Hence, the recommendations for action encompass psychological tests (Howell and Higgins 1990), analysis through technical systems (Reibenspiess et al. 2022), observations of interpersonal interactions (van Laere and Aggestam 2015), peer nominations (Renken and Heeks 2019), the importance of company culture (Reibenspiess et al. 2018) and the knowledge of the traits that the champion needs to possess as non-trainable characteristics (Reibenspiess et al. 2018).

Development Phase: Once identified, the IS champion is developed with the goal of enabling the IS champion to support the digital innovation process. This phase only covers skills and knowledge since traits are untrainable (Reibenspiess et al. 2018,). The recommendations for action encompass exposure to potential ideas (Reibenspiess et al. 2022; Yan et al. 2018) and the provision of knowledge about, for instance, digital innovation, the organizational strategy, the innovation's context, innovation opportunity analysis, and design patterns (e.g., Fichman et al. 2014; Howell and Shea 2006; Nambisan et al. 2017; Renken and Heeks 2019). Moreover, they include creating networking opportunities (e.g., Reibenspiess et al. 2018; van Laere and Aggestam 2015), encouraging a diverse and extensive career experience (Renken and Heeks 2019), agility on the project and company level (e.g., Beath

			Champion Journey		
			Identification	Development	Reinforcement
Technical	Supporting tools	What	Making assessments as uniformly as possible based on as many candidates as possible.	Supporting the supply of information on ideas and knowledge to the champion.	Reinforcing extrinsic motivation by visibility and appreciation.
		How	Ensure that the technology measures objective indicators. Ensure that the technological measuring process covers a wide range of subjects.	Ensure that the champion is constantly exposed to various personalized idea channels covering vertical and horizontal expertise areas. Enable the acquisition of knowledge on the problem and solution space.	Enable the record of championing activities for predefined goals. Ensure that the motivational incentives motivate the champion playfully without putting them under pressure.
		Examples	Psychological tests, algorithms evaluating curricula vitae, structured interviews, platforms for self-presentation.	Forum, wiki, collaboration tools, vision board, learning platform, workshop animation, videos, podcasts, gamification modules, chat environment, webinars, people development management tool.	Award announcement, bonus collection program, cards to make gratitude visible, blog posts, gratitude chat channel.
	Interactions of and with the champion	What	Revealing the subject's ability of networking, promoting, and team working.	Constantly exposing the champion to interactions with potential and actual stakeholders.	Reinforcing extrinsic motivation by providing more freedom in interactions and a wider range of these.
		How	Enable observation of interactions in as natural an environment as possible. Ensure that the interactions that show champion potential occur during the assessment period.	Ensure that the champion meets people from different teams and departments. Enable the champion to deepen the relationship informally at the workplace.	Ensure that the champion is given greater freedom in areas of their champion activities. Enable the champion to expand the reach of their interactions.
		Examples	Participatory observation, interviews with steering members, targeted questions to reveal how a person acts.	Chats, workshops, flexible and open spaces, virtual team building, events, open talks, idea challenges/hackathon, random chats, topic channels, social days, regular's table.	Time at free disposal, allowance of order undermining, access to new networks, talking in front of a large audience.
Social	Organizational environment	What	Uncovering the champion's characteristics and behavior for the decision-makers responsible for the identification.	Minimizing obstacles and maximizing autonomy.	Reinforcing extrinsic motivation by assessing the behavior according to the abilities and the situation.
		How	Ensure that the culture is conducive to getting behavioral information revealing the champion's characteristics to decision-makers.	Ensure that the structure enables to gain diverse experience. Enable an autonomous development of the champion. Enable integration of the community into the champion's development process.	Ensure that the champion is appreciated for their behavior. Ensure that also adverse outcomes of the innovation project do not affect the champion's performance measurement.
		Examples	Open and appreciative culture, envy-free culture, speak-up culture.	Entrepreneurial, supporting, target-oriented, change-oriented culture, few hierarchical levels, innovation challenges, forcing to make mistakes.	Behavior-based performance appraisal, compensations, behavior-based promotion system, career paths, celebrating successes.
	Skills, knowledge and traits of the champion	What	Knowing the subject's set of traits and experience serving as a basis for development and being indispensable.	Providing learning possibilities for the champion's individual needs.	Offering approaches for intrinsic motivation.
		How	Ensure that the person who carries out the identification knows the characteristics: creativity, enthusiasm, confidence, risk-taking, persistence, optimism, proactivity, purpose fit, professional experience. Ensure to screen the data for the defined set of characteristics.	Enable the champion to develop the following skills and knowledge: learning orientation, transformational leadership, communication, connection, integration, networking, supportiveness, intercultural competence, technical, organizational, and macroenvironmental knowledge.	Enable the champion to find their individual triggers for their intrinsic motivation. Ensure the champion has reason to identify with the organization.
		Examples	Questionnaire, involve HR and technical department in the process	Training on transformational leadership, Scrum Master, strategic thinking, solution making, and agility, workshops on technical, methodological, and organizational knowledge and the values, leadership circle, coaching, mentoring, learning by doing, specialist literature.	Coaching on learning orientation, develop a personal vision, promoting the company vision and mission, reinforce the purpose fit and identification, offering triggers (e.g., visibility, knowledge sharing, exchange).

Fig. 4 The Framework Version for Form1. *Note:* For better readability, the references were not included in the Figure but are described in Sect. 4.2. and in more detail in Appendix A.1

1991; Chan et al. 2019) and providing training on hard and soft skills (e.g., Howell and Higgins 1990).

Reinforcement Phase: The reinforcement is necessary to further motivate the IS champion to promote innovations, in addition to self-motivation and self-affirmation. The IS champion can be reinforced both during and after their development. Literature stays relatively silent on what motivates the champion (Renken and Heeks 2019). For this phase, therefore, the existing literature can only be consulted indirectly. Recommendations for action might encompass rewarding both the success and failure of the innovation project and its champion (Reibenspiess et al. 2018), for instance through announcements (Reibenspiess et al. 2022), or expanding the champion's network by giving them access to organizational or management networks (Reibenspiess et al. 2018), and encouraging champions to learn from their experiences and improve their championing skills (van Laere and Aggestam 2015).

4.3 Design stage II—Framework version for formative evaluation

The first formative evaluation (form1) informed the iteration of the framework for Design Stage II. The evaluation phase of the first cycle, described in detail in Appendix A.2., showed that the chosen approach addressed the problem but faced constraints. The experts especially valued the champion journey and the separation of social and technical aspects (Experts 1, 3, 4 and 6, form1). Therefore, the three types of building blocks did not change throughout the iterative development of the framework. The biggest room for improvement arose from feedback on the graphical presentation of information and the amount of text included in the framework (Experts 2, 3 and 6, form1). In this iteration, seven different graphical representations with different levels of information detail were developed to be assessed in form2. These different graphical representations are depicted in Fig. 5. The graphical representations were mainly inspired by one expert's suggestion that development and reinforcement are less sequential and more cyclic (Expert 6, form1). Further inspiration was derived from the feedback that the champion journey phase has drivers, that some experts perceived the champion concept as elusive, that the champion's sense of purpose is essential, and that the delineation of recommendations for action per champion journey phase is not always clear (see Appendix A.3 for details).

4.4 Design stage II—Framework version for summative evaluation

Building on the second formative evaluation, the alternatives were merged into one representation, mainly based on draft 5 (see Fig. 5).

The amount of text was further reduced (Experts 1 2, form2). The colors were changed to shades of green, limiting the range of false interpretations (Expert 2, form2). Puzzle pieces provide readability and clarification of the contextual connection of the recommendations for action (Expert 1, form2). The prefix "re-" was added to the identification phase (Expert 1, form2); the champion journey, however, was not further detailed per se, as it seemed sufficiently realistic for the model-like nature of the framework. The purpose fit was omitted (Experts 1 and 2, form2). Further, the

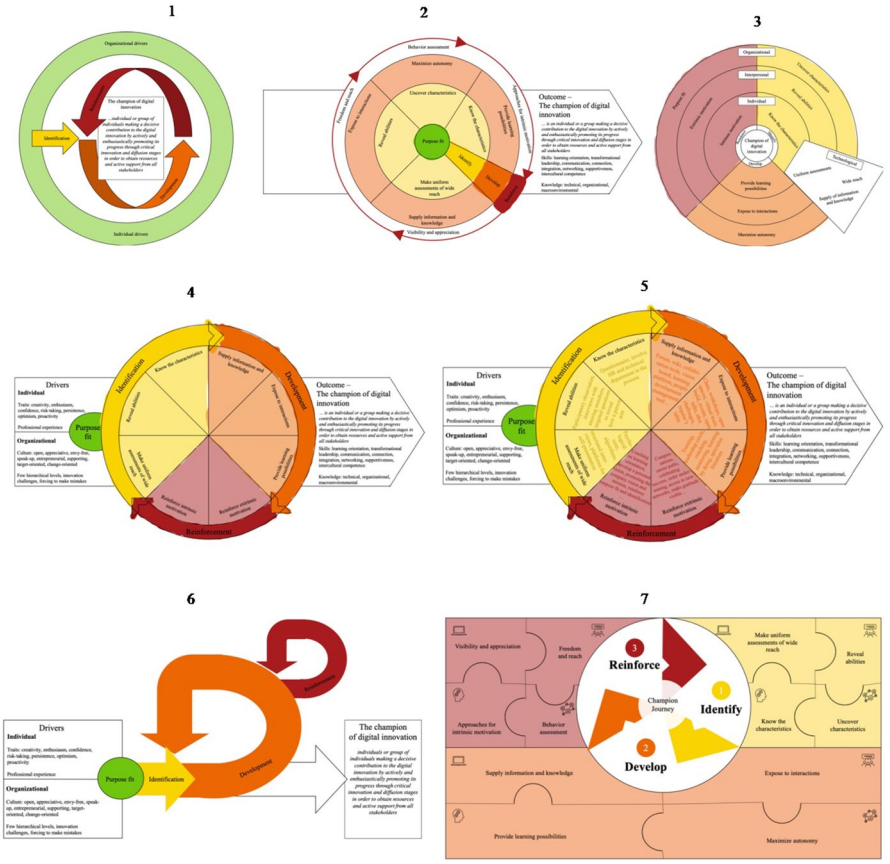

Fig. 5 The Framework's Evolution during Form2. *Note:* Draft 2 and draft 3 were adapted from (Doughnut Economics Action Lab (DEAL), 2021), draft 4 and draft 5 were adapted from (pslides nd Integrated talent management model for PowerPoint. Pslides. https://pslides.com/templates/integrated-talentmanagement-model-for-powerpoint/, draft 6 was adapted from (EnableChange 2021), and draft 7 was adapted from (Muther 2002; Osterwalder 2004). The figure is used to show how the visual appearance evolved

wording of the recommendations for action was adapted based on the experts' interpretations. Finally, examples were added to the artifact as a separate cycle with the same arrangement of puzzle pieces. This made it easier to connect the framework to the examples for reference. The revised version of the framework is depicted in Fig. 6.

4.5 Design stage II—Final version

The feedback from the second evaluation was considered in the development of the final version, shown in Fig. 7. The STS component "structure", initially represented as a driver on the left side of the circle, was changed to a larger circle that encompasses recommendations for action around the champion journey to represent the

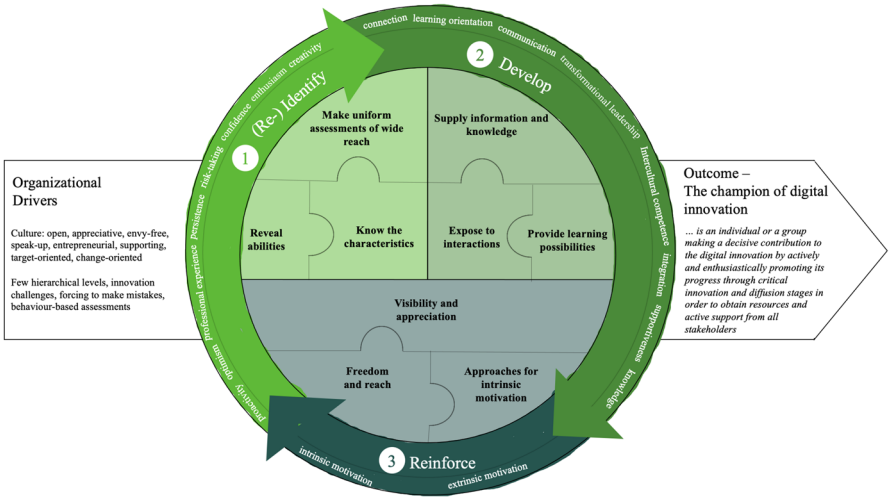

Fig. 6 The Framework Version for Summ. *Note*: The visual appearance is inspired by (pslides nd.Integrated talent management model for PowerPoint. Pslides. https://pslides.com/templates/integrated-talentmanagement-model-for-powerpoint/)

prerequisites (Experts 3, 4 and 6, summ). The champion journey phases were changed to equal length to represent the equal importance of each phase (Expert 7, summ). The champion journey circle symbolizes the iterative process of developing an IS champion as the subject of the process. However, Expert 6 (summ) assumed one iteration per individual and interpreted the circle as a way to identify new champions through the developed champion and their actions, thereby triggering a subsequent iteration. Therefore, the champion was put in the center of the circles. Additionally, the wording of the framework was changed, based on the experts' feedback.

5 The final framework for nurturing IS champions

In the following, we present the final framework for nurturing IS champions. We first present the framework's different elements and give recommendations for actions in Sect. 5.1. In Sect. 5.2. we then offer two concrete use cases of the framework in order to make the use of the framework more tangible for practitioners. Moreover, in Sect. 5.3. we offer actions and paths stakeholders can take to nurture champions.

5.1 The elements

The proposed framework conceptualizes the nurturing of IS champions within three development phases: (*re-)identify*, *develop*, and *reinforce*. Those champion journey phases, the components of STS theory, and the IS champion's characteristics form the framework's building blocks. The framework offers

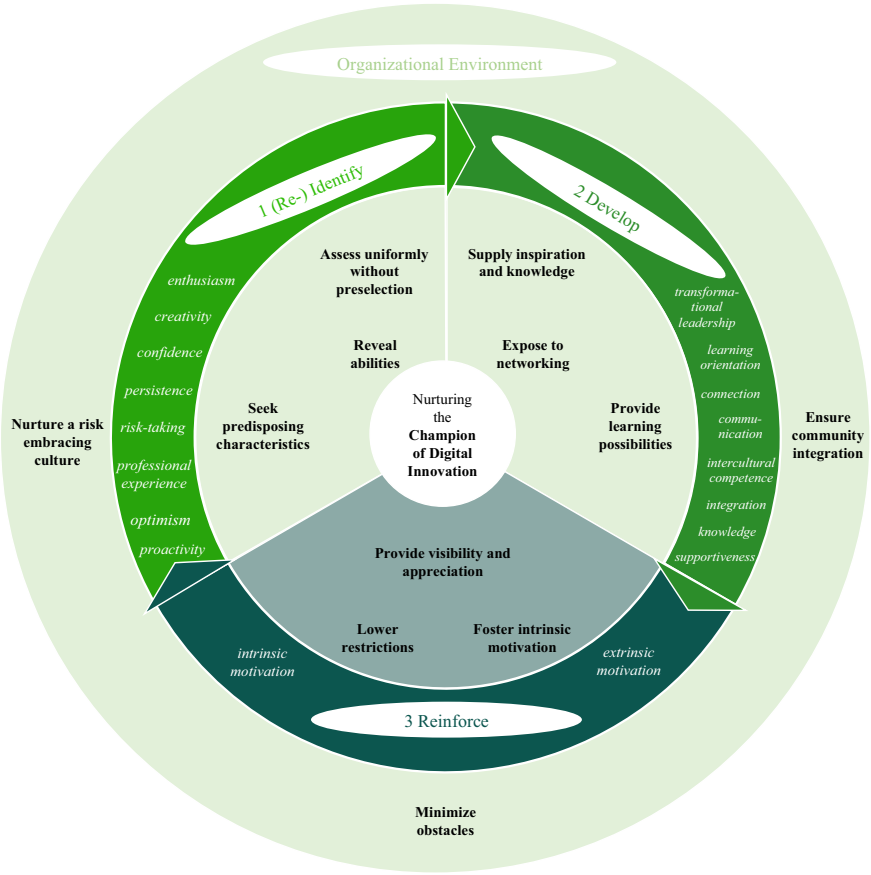

Fig. 7 The Framework for Nurturing IS Champions. *Note:* The framework encompasses three development phases: (*re-)identify*, *develop*, and *reinforce,* the IS champion's characteristics (associated with a champion journey phase) and recommendations for action per phase – respectively one associated with the component "task", "actor", and "technology" – as the framework's inner circles. The STS component "structure", depicted in the outer circle, represents the cultural and organizational environment in which the champion interacts

practice structure and inspiration for thought to elaborate an organization-specific instantiation of the champion journey on a strategic level. It enables a more encompassing view of the development of the champion role and provides certainty in pursuing its implementation.

The phases are portrayed in the second outer layer of the circle (e.g., develop) along with the IS champion's traits, skills, knowledge, and motivation to be addressed in each phase. Each phase can manifest in three elements (e.g., supply inspiration and knowledge). Concrete actions and techniques are provided for every element (see Tables 2–5) so that practitioners can apply the framework seamlessly in their daily practice. In Sect. 5.3. we further provide recommendations about who could implement the recommendations for action, respectively.

Table 2 Recommendations for action for the champion's cultural and organizational environment

Recommendations for action	Examples	STS component
Nurture a risk embracing culture	Entrepreneurial and envy-free culture, encouraging employees to make mistakes and learn from failures	Structure
Minimize obstacles	Few hierarchical levels, high degree of freedom, proactive and change-oriented management	Structure
Ensure community integration	Innovation challenges, collaboration opportunities, team building, open, appreciative and supporting culture	Task

While each champion journey phase encompasses three recommendations for action—respectively one associated with the component "task", "actor", and "technology"—the STS component "structure", represents the cultural and organizational environment in which the champion interacts and forms the basis for the champion journey circle. The reason is that implementing the cultural and organizational characteristics proposed in the literature and by the experts demands a different timeline, skillset, and especially a different framework (Experts 3 and 4, summ). The recommendations for action and associated examples for the "structure" component are presented in Table 2.

The most challenging aspect of our framework is the necessity of changing the organizational environment in which champions act. Organizational culture may be designed to encourage employees to embrace risk, with the understanding that mistakes are an inherent part of the learning process. The establishment of weakly hierarchical structures with high degrees of freedom can further enable champions to encounter few obstacles in their work. Because champions frequently act in teams, particularly in the context of digital innovation endeavors, the establishment of an open and supportive atmosphere with numerous collaboration opportunities may prove conducive to the nurturing of champions.

The champion journey circle starts with *identifying* the champion, which after one completion of the champion journey turns into reidentifying. One major issue in current literature is identifying champions (Renken and Heeks 2019) which is associated with the difficulty of defining the champion (Reibenspiess et al. 2018). However, identifying is vital to be able to assess the impact of the measures. The framework targets the traits found by Reibenspiess et al. (2018) and diverse career experience (Renken and Heeks 2019). The recommendations for action, the corresponding STS theory component, and associated examples are presented in Table 3.

Consequently, organizations may rely on measures such as questionnaires, targeted interviews, and screening curricula vitae of new applicants to identify potential champions based on their traits. Additionally, creating an internal innovation platform where employees share and promote innovative ideas, or organizing innovation time or events, such as hackathons or participatory open innovation formats, offers valuable mechanisms to identify employees exhibiting championing based on their traits and behavior. By implementing such measures during the hiring process and as part of an organization's efforts to promote innovation, organizations can

Table 3 Recommendations for action for the champion journey phase "re-identify"

Recommendations for action	Examples	STS component
Assess uniformly without preselection	Psychological tests, algorithms evaluating curricula vitae, structured interviews, platforms for self-presentation, employee's development scores evolution, skill platforms	Technology
Reveal abilities	Participatory observation, interviews with steering members, targeted questions to reveal how a person acts	Task
Seek predisposing characteristics	Questionnaire, involving HR and technical department in the process	Actor

identify a pool of potential champions. These employees can then be further developed (see below). Moreover, organizations can entrust these individuals with important innovation projects or add them to innovation projects that have experienced difficulties in the past. While some measures are designed to be implemented over an extended period (e.g., establishing platforms), targeted hiring measures or innovation events can also be employed as short-term measures to identify a champion who could assist in overcoming difficulties in an ongoing innovation project.

Once identified, the IS champion is subject to formal and informal *development*. To be considered an IS champion, the person's characteristics can vary in their strength of expression (Howell and Shea 2001; Walter et al. 2011). Nevertheless, the framework encompasses the complete set of the IS champion's skills and knowledge (Reibenspiess et al. 2018) and digital competences (derived from Yoo et al. (2012)) to enable the adaption of the development phase to the team's and individual's needs and, if necessary, constraints. The recommendations for action, the corresponding STS theory component, and associated examples are presented in Table 4.

The development of champions can be facilitated through the establishment of knowledge transfer mechanisms in various formats, including wikis, learning platforms, and podcasts. These formats allow potential innovation champions to independently gain knowledge, thereby fostering their capacity to innovate. The content of the learning program may include in-depth knowledge about the characteristics of digital technologies, the innovation process, and the use of methods such as innovation opportunity analysis (see Appendix A.1 for details). Given the advantages of extensive social ties and social skills for champions, companies can also facilitate the nurturing of champions during this stage by providing opportunities for networking through the organization of events and by making conscious design choices for their office, such as the creation of open spaces or room for people to meet. Since numerous skills characterizing champions can be intensified (and sometimes even learned) through training, the provision of learning possibilities offers a third potential avenue for the nurturing of champions. Opportunities for the development of champions here include training in leadership skills or individual coaching and mentoring.

Table 4 Recommendations for action for the champion journey phase "develop"

Recommendations for action	Examples	STS component
Supply inspiration and knowledge	Forum, wiki, collaboration tools, vision board, learning platform, workshop animation, videos, podcasts, gamification modules, chat environment, webinars, people development management tools	Technology
Expose to networking	Chats, workshops, flexible and open spaces, virtual team building, events, open talks, idea challenges/hackathons, random chats, topic channels, social days, regular's table	Task
Provide learning possibilities	Training on transformational leadership, Scrum Master, strategic thinking, solution making, and agility, workshops on technical, methodological, and organizational knowledge and values, leadership circle, coaching, mentoring, learning by doing, specialist literature, exercises, role models, knowledge clubs, retrospectives	Actor

The *reinforcement* targets the motivation of the IS champion to promote innovations. This phase aims to stimulate and encourage champions' ongoing efforts in promoting further innovations. By implementing reinforcement mechanisms, such as rewards, recognition, and opportunities for professional growth, organizations can tap into the champion's inner drive and amplify their motivation to excel in their role in the long term. The recommendations for action, the corresponding STS theory component, and associated examples are presented in Table 5.

This phase of the IS champion journey specifically targets the champions' intrinsic and extrinsic motivation. By providing visibility and appreciation, for instance, by recognizing the champion through awards or public announcemenst or by sharing the financial benefits of a successful innovation project with the champion, champions' extrinsic motivation may be increased. Additionally, measures, such as innovation time, where champions can use part of their working week to promote digital

Table 5 Recommendations for action for the champion journey phase "reinforce"

Recommendations for action	Examples	STS component
Provide visibility and appreciation	Award announcement, bonus collection program, cards to make gratitude visible, blog posts, gratitude chat channel, regular meetings, appreciation according to individual needs, organigram entry	Technology
Lower restrictions	Time at free disposal, allowing order to be undermined, access to new networks, talking in front of a large audience, absence of micromanaging	Task
Foster intrinsic motivation	Coaching learning orientation, developing a personal vision, promoting the company's vision and mission, reinforcing purpose fit and identification, offering triggers (e.g., visibility, knowledge sharing, exchange, prestige, responsibility), communicating role's impact	Actor

innovation projects, or access to influential networks on the management level can lower restrictions to continue their role as champions. Finally, champions' intrinsic motivation may be reinforced through measures that enable champions to reflect on their role's impact and their contribution to the company's vision, such as through coaching.

5.2 The use cases

Throughout the evaluation episodes, the experts gave insights on how to apply the framework in practice. While they generated a lot of ideas, e.g., team alignment (Expert 6, summ), use by IS champions to plan and assess their nurturing (Expert 3, summ), or examination and improvement of organizational roles (Expert 5, summ), all experts saw possibilities for the following two use cases: the development of a career path for IS champions and the communication of the IS champion nurturing.

When developing a career path for IS champions, the strategy should be "*that you just have to provide people with the right, nutritious soil*" (Expert 6, summ) and let them create the role for themselves (Expert 6, summ). The framework supports the development in three ways. First, the framework can help to elicit the target-actual comparison. The user can identify measures already in operation and those yet to be implemented to nurture the IS champion (Expert 6, summ). Second, the framework guides the champion journey by clarifying and visualizing the process (Experts 3 and 6, summ). A competence model and role profile can be developed based on the IS champion's characteristics. Then, the measures that enable the IS champion can be developed (Expert 6, summ). Therefore, the phases identified by the framework (Expert 4, summ) must be refined into a concrete implementation plan (Expert 3, summ) with, e.g., sequences of training (Expert 5, summ). The framework offers recommendations for action to guide the refinement (Expert 6, summ). Third, the framework supports the plan's implementation by providing an audit trail of the IS champion's current status (Expert 3, summ). In addition, rating scales can be derived from it, which can track the nurturing (Experts 3 and 7, summ) and assess if the champion journey creates an IS champion as the outcome (Expert 5, summ).

The second use case is the communication of the IS champion's nurturing. The communication is directed to the employees' managers (Experts 5 and 6, summ), the sponsors of the framework's implementation, and top management (Expert 6, summ). While Expert 3 (summ) gave a contradictory opinion on the usefulness of communication directly to the IS champion, Expert 6 (summ) saw an opportunity to explain the development phases needed for nurturing the IS champion to people who have little knowledge about that, like, e.g., the IS champion. Through the framework, the strategy for development, instead of the detailed implementation, can be communicated (Experts 4 and 6, summ). Communication can define the target outcome and clarify how the career path can be supported. For that, the framework is explained phase by phase. It gives visibility to the project (Expert 6, summ).

5.3 Paths forward for stakeholders

To nurture champions, stakeholders across an organization can take several steps to promote an environment that fosters innovation and encourages the identification and development of talented individuals. Table 6 provides an overview of how different stakeholders can use the framework's recommendations for action to nurture champions. Detailed examples of how each recommended action can be implemented were already summarized in Sect. 4.2.

Across all phases, upper management can nurture a risk-embracing culture that rewards experimentation, an entrepreneurial mindset and encourages employees to make and learn from their mistakes. They can also minimize obstacles by reducing hierarchical levels and promoting proactive and change-oriented management. Ensuring community integration forms an additional building block for how upper management can foster a beneficial cultural and organizational environment for champions by offering innovation challenges and supporting collaboration.

The identifying phase of the champion journey can especially be supported by HR managers. They can assess potential champions uniformly without preselection, by, for instance, using psychological tests or trained algorithms to evaluate all employees based on their abilities and potential rather than preconceived notions or biases. During the hiring process of new employees, they may further seek candidates who possess predisposing characteristics that suggest an aptitude for driving innovation. Additionally, during this phase line managers can use participatory observation to reveal abilities or provide opportunities for employees to showcase their skills.

During the development phase, line managers in particular are asked to take action. They can supply inspiration and knowledge by introducing tools, such as wikis or collaboration tools, in collaboration with the IT department. They can also expose employees to networking opportunities, both within the company and beyond, to help them develop relationships and expand their horizons. Additionally, HR managers can provide learning possibilities to help employees develop their skills and knowledge, for instance through formal training programs or mentoring programs.

Finally, during the reinforcement phase, HR managers and line managers can use complimenting actions to support the champions' nurturing process. They can provide visibility and appreciation to champions by recognizing and rewarding innovative ideas and contributions. Line managers can lower restrictions by assigning innovation champions' time at their own disposal or avoiding micromanaging them. Additionally, HR managers can foster champions' intrinsic motivation by empowering them to pursue their ideas and by providing opportunities for personal growth and development.

6 Summative evaluation

In the following, we present the summative evaluation results based on widely established criteria. Detailed information on the two formative evaluations can be found in Appendix A.2 and A.4, respectively. First, the derived framework was evaluated concerning its validity and completeness (March and Smith 1995). Second, applicability and feasibility, as well as the problem and solution space, formed important criteria (Nunamaker et al. 2015).

6.1 Validity and completeness

Regarding completeness, the framework was found to cover the essential information. "*[These] puzzle pieces. … they are so relatively general, you can sort a lot in there, so you don't need more, I would say*" (Expert 3, summ). According to the experts, missing elements were the impact of the framework on the organization (Experts 4, 6 and 7, summ), a needs analysis phase before starting the champion journey (Expert 6, summ), and the influences of other stakeholders that act on the IS champion (Expert 3, summ). Expert 5 (summ) demanded the inclusion of examples in the framework because they clarify the recommendations for action. However, in line with the results of the second formative evaluation, Experts 4 and 6 (summ) did not share this opinion. "*So, once you get into the content, it's not a framework anymore*" (Expert 4, summ). Even though some experts considered the environment relevant, the impression remained that this is thematically obsolete for the framework (Expert 6, summ).

Further minor adjustments and additions were implemented based on the summative evaluation as long as they befitted the level of detail intended for this framework and the impression gained from the experts' comments. For example, Expert 4 (summ) missed an explanation of the parts showing the champion's characteristics. This was not deemed necessary because no other expert had issues understanding this.

Regarding validity, the experts repeatedly assessed the framework to be close to business reality, except for some delineations (Experts 3 and 6, form1). Expert 6 suggested adapting the framework to be role-specific. In her opinion, the IS champion, different HR teams, and managers need a different perspective on nurturing (Expert 6, summ), as they have slightly different tasks in the champion journey (Experts 6 and 7, summ). Only Expert 4 (form1) focused on goal-setting frameworks and could not identify with this approach.

It is recognized that the framework still cannot be considered exhaustive. However, it is designed in such a way that it can still be extended in future research. The framework still has room for interpretation, but overall, the evaluation led to the conclusion that it proposes a suitable approach for nurturing IS champions.

Table 6 Overview—Stakeholders' involvement in nurturing champions

Phase	Recommendation for action	Stakeholders
All phases	Nurture a risk embracing culture	Upper management
	Minimize obstacles	Upper management
	Ensure community integration	Upper management and line manager
Identify	Assess uniformly without preselection	HR manager
	Reveal abilities	HR manager and line manager
	Seek predisposing characteristics	HR manager
Develop	Supply inspiration and knowledge	IT and HR managers
	Expose to networking	Line manager
	Provide learning possibilities	HR manager
Reinforce	Provide visibility and appreciation	HR manager and line manager
	Lower restrictions	Line manger
	Foster intrinsic motivation	HR manager

6.2 Applicability and feasibility

Essentially, all experts were able to use the framework, assess the possibilities in their organization, and suggest examples. Nevertheless, Expert 4 (summ) did not like the framework because he did not see the framework's impact. In contrast, Experts 3 and 6 (summ) liked the framework and pointed to its long-term perspective: "… *you probably won't even see the outcome that much in phases 1 and 2. Rather, it will only be in a longer phase. In this phase you must create trust. This can be done through a framework*" (Expert 6, summ).

Despite the adaption of the graphical representation during the two design stages, room for interpretation remained regarding the champion's journey and the recommendations for action. Yet, the feedback from the experts did not challenge the content but pointed to interpretability. Experts 6 and 7 (summ) initially understood the addressee of implementing the framework to be the IS champion. Therefore, they did not clearly understand the champion's journey and the recommendations for action. Expert 3 (summ) understood reinforcement as reinforcing positive traits and correcting negative traits, not just motivation in general. The champion journey circle symbolizes the iterative process via which one IS champion as the subject of the process is developed. However, Expert 6 (summ) assumed one iteration per individual and interpreted the circle as a way to identify new IS champions through the nurtured IS champion and their actions, thereby triggering a subsequent iteration. Understanding the recommendations for action needed examples (Experts 5, 6 and 7, summ) regardless of whether the examples are then used for implementation or own measures are chosen.

The graphical representation needed to be adapted to reach feasibility and adaptability of the framework throughout the evolution of the artifact. In addition, the framework alone was considered insufficient to guide practice, and a descriptive text, such as the revised, detailed tabular representation of the framework was necessary for reference. While the experts demanded further information on

how to implement a development strategy, such as detailed processes for each champion journey phase, the impact of organizational characteristics, and process measurements, the lack of this information does not influence the framework's feasibility and adaptability.

6.3 Insights into the problem and solution space

Most experts found the IS champion concept easy to grasp based on the definition provided in the literature (Experts 3, 4 and 6, summ). In contrast, others found it elusive in terms of competencies and activities (Expert 7, summ) or overlapping with other roles (Expert 5, summ). However, including the characteristics in the framework made the role much more tangible to the experts. Experts 3 and 5 (summ) doubted such an actor could be nurtured but would still try to because they found IS champions necessary. Given the time pressures all employees face, a dedicated role seems appropriate to ensure IS champion activities are implemented (Expert 7, summ).

For successful implementation, the organization's expectations of innovation must be realistic (Expert 3, summ). Implementation of the framework must be consistent with strategic, tactical (Expert 4, summ), and group objectives (Expert 5, summ). The economic situation must allow implementation (Expert 4, summ). However, focusing on financial questions could hinder development (Expert 5, summ). Within projects, there are budget problems in implementing the development of IS champions (Expert 7, summ). Therefore, Expert 5 (summ) considered only medium-term implementation to be possible.

Implementing organizational drivers could present problems, as this is a change management issue (Expert 3, summ). Another problem is the lack of potential candidates (Expert 7, summ). With staff shortages, developing IS champions might not be well received by other colleagues if it is not clear what IS champions can contribute. This is particularly an issue in cultures that are not change-oriented and envy-free (Expert 7, summ).

According to Expert 6 (summ), the implementation demands much trust from HR and managers because there is no direct outcome of the measures. HR wants to lead the development process very strongly, which is inadequate for developing an IS champion. A framework can give HR and managers the confidence and assurance to proceed with nurturing in such a situation. Nevertheless, appropriate people should be involved in the implementation process, accompanied by training. The evaluation also points to the boundary of our framework. While the experts agree that the framework is complete, valid, hands-on and tailored to their organizational needs, it does not offer an immediate solution to "producing" IS champions. Instead, its ultimate effectiveness depends on its implementation by human resource professionals.

7 Discussion

In this paper, our theoretical contribution to research is twofold. First, we extend knowledge on the nature vs. nurture perspective in the emergence of champions, as discussed in Sect. 6.1. Second, we contribute to personnel development by offering insights into IS champions' journeys and actions for their nurturing. Additionally, our framework offers practical, conceptual relevance (Nicolai and Seidel, 2010). In Sect. 4.4., we described how stakeholders across an organization can guide and inspire action by promoting an environment that fosters innovation and encourages the identification and development of talented individuals. In Sect. 6.3. we provide further practical guidance by outlining how our framework for nurturing IS champions can also be instantiated as (1) parts of a legacy system or as (2) a new system. Finally, we outline limitations and offer insights for future research.

7.1 Nature versus nurture in the emergence of champions

The theoretical gap addressed is the nurturing of IS champions. With an ongoing discussion in the literature about the "nature versus nurture" of champions (Renken and Heeks 2019) – a consideration that also troubled the experts, this research contributes to the "nurture" perspective. The framework gives practice guidance on the identification and nurturing of champions. Despite the importance of digital innovation and employees' contribution (Thompson et al. 2020), particularly the importance of champions (e.g., Howell et al. 2005; Maidique 1980; Schon 1963), prescribing how to nurture IS champions exceeds prior literature.

The design approach sets this research apart from other research on champion nurturing (Gregor 2006; Renken and Heeks 2019). For example, Howell and Higgins (1990) developed a model stating the champion's personality, transformational leadership, and influence tactics as the variables of the champion's emergence. Reibenspiess et al. (2018) continue the idea by identifying additional enabling factors from the literature, considering the individual and organizational factors. However, none of them prescribe how to nurture IS champions by incorporating relevant findings from the literature. Literature suggests studying nurturing possibilities (e.g., Howell and Higgins 1990; Renken and Heeks 2019) and enabling organizations to benefit from IS champions (Reibenspiess et al. 2018; Renken and Heeks 2019). Based on the summative evaluation, it is argued that this research contributes to the knowledge base with the framework providing feasible guidance for IS champion nurturing.

7.2 Nurturing champions: Transformation in personnel development

This research also contributes ideas to personnel development in organizations seeking digital innovativeness. The evaluations' results demonstrate that the framework provides a suitable structure for guiding and encouraging strategic

thoughts on the nurturing of champions, who promote digital innovation and shape digital technologies' design. While the framework's champion journey phases are generally not new to organizations, the socio-technical model provides an interesting lens on personnel development in general. Further, it depicts that decision-makers should consider "nurturing" as encompassing more than just formal, time-limited training to create long-lasting benefits for the organizations after the training of the employees (Beer et al. 2016).

The generic socio-technical model (Leavitt 1964) offered a lens for conceptualizing different measures for the nurturing of IS champions. The organizational influence was addressed through the technology, task, and structure components. The experts confirmed that training alone was not enough to nurture IS champions. The experts appreciated not only the view of the individual but especially highlighted the influence of technology and corporate culture on nurturing.

With the increasing complexity of digital innovations and constant changes, it seems relevant to incorporate more determinants for innovativeness (Crossan and Apaydin 2010) into employee development to make nurturing ubiquitous in everyday work. This paper proposes to redefine "employee development" through the lens of the socio-technical model toward a more encompassing understanding. This proposed lens may extend the boundaries of when nurturing is considered feasible and then align organizational measures for more efficient personnel development.

7.3 Framework instantiation in IS application: delegation and control

Solving the IT workforce problem is a moving target (Niederman et al. 1991), and the same can be said about nurturing IS champions. IS research points to a socio-technical evolution in human resource management—that is, the co-evolution of HR processes and supporting technologies (Johnson et al. 2016). Our framework for nurturing IS champions focuses on the HR processes with recommendations for appropriate tasks and a toolbox. However, the framework can also be instantiated as (1) parts of a legacy system or as (2) a new system.

Human Resource Management System (HRMS) is an example of a suitable legacy system. This class of system is widely used in organizations of different sizes and industries across the globe, with instances ranging from payroll management applications to talent management (e.g., SAP SuccessFactors). HRMS can be divided into different modules. Our framework for nurturing IS champions also consists of three main modules, and each of them can be instantiated as an IS module. The instantiation approach can vary in degree of automation (e.g., using artificial intelligence (AI) to provide recommendations versus relying on key stakeholders (cf. Section 4.4)). This is probably the key decision to make.

Recent discourse on the use of AI in making HR-related decisions points to both the bright and the darker side (Bankins et al. 2022; Strich et al. 2021). IS researchers sometimes refer to this phenomenon as algorithmic management (Cameron et al. 2023; Möhlmann et al., 2023). Ben Shneiderman's framework of human-centered

AI (Shneiderman 2020) challenges the popular view about automation—that an increase in automation (e.g., with the use of AI) decreases human control. According to the framework, designers can aim for both high automation and high human control. We follow this view.

When it comes to the instantiation of the framework, the goal is not to take away the control from key stakeholders (e.g., HR manager, upper management). Instead, the system can support these stakeholders in their decision-making. Some tasks can be delegated to the system. We can use the recommendations for action as requirements for such an instantiation.

The identification phase helps to select employees with the potential to become IS champions. Its instantiation should not be fully automated, because IS champions themselves are a moving target. However, the module can provide recommendations based on preliminary criteria. The development phase is about providing potential IS champions with suitable exposure and training. An IS module for this purpose can help to match the timing, needs, and offerings of training and networking solutions. Finally, the reinforcement phase is about strengthening desirable initiatives. This is not trivial to instantiate. A possible example is enabling individual recognition (e.g., birthdays and other significant events) as well as team recognition.

The above discussion should be seen as a trigger for further discussion and further study on such an instantiation. By no means do we claim the instantiation possibility exhaustive.

7.4 Limitations and future research

The proof-of-concept only produces modest insights (Nunamaker et al. 2015). This raises exciting opportunities for future research, especially in completing the last research mile, that can address the limitations of this work.

First, insights from the formative and summative evaluations were gained through one-on-one interviews with experts inheriting the limitations in the representativeness of qualitative research. Although the sample was carefully chosen from a wide range of experience and corporate cultures to provide as general a picture as possible at this early research stage, future work building on this research may require a quantitative evaluation. It would be especially interesting to study the influence of individual and organizational characteristics like social cultures, e.g., motivated findings by Shane (1995), on the framework. Moreover, the experts were predominantly working in the IT industry. Consequently, future research would need to evaluate whether the findings can be generalized to other industries as well.

Second, there is limited evidence that the persons that the experts directly or indirectly referred to are IS champions. Therefore, studies that consider an explicit identification may conclude that some findings do not quite fit the IS champion. This issue was addressed by defining the IS champion for every expert in detail. Renken and Heeks (2019) suggest that future research could study profiling tools that allow an adequate identification of IS champions. Future research could build on the structure proposed here for a more sophisticated identification process and more clearly delineate the nurturing of the IS champion.

Third, the artifact is not fully featured and thus does not allow any conclusions about efficiency and applicability in real situations (Nunamaker et al. 2015). This paper sought to best translate the findings from the literature and expert interviews into an artifact. However, the framework must be supplemented with other artifacts in the next two phases of the last research mile to guide the implementation in practice. This should be accompanied by measuring the impact on an organization's innovativeness. While all experts assumed a positive impact on the overall innovativeness, this needs to be elaborated by applying the framework in practice. Section 6.3 discusses possible pathways for instantiating the framework in legacy or novel IS applications.

8 Conclusion

This research is inspired by the importance of IS champions on the organizations' innovativeness. With the ongoing "nature vs. nurture" discussion in literature, this Design Science Research approach contributes to the "nurture" perspective of the identified research gap regarding IS champions. The designed framework represents the proof-of-concept and proposes phases and recommendations for action to nurture IS champions. It encompasses the current knowledge base relevant to nurturing enriched through interviews with leaders in organizations concerned with digital innovation, predominantly in the IT industry. As the evaluation showed, the resulting artifact is close to reality and feasible for potential addressees. Further, the improved understanding of the problem and solution space of nurturing IS champions informs the knowledge base. Besides enriching our extant knowledge of IS champions and extending design knowledge, the paper offers practical implications for the structure, recommendations for action, and examples. The artifact enables the strategic nurturing of IS champions, the communication, and the coordination of the IS champion nurturing project.

Appendix A: Detailed information on the evolution of our framework

In this appendix, we provide detailed information on the evolution of our framework during the two design stages. Consequently, this appendix provides detailed information to complement Sect. 4.

A.1 Design stage I - Framework version for formative evaluation: detailed information

In the following, we provide detailed information on findings in the literature concerning the three stages of the innovation champion journey: identification, development, and reinforcement.

A.1.1. The identification

Technology. The technology component encompasses measures to move from highly subjectively influenced identification to objective decisions. Howell and Higgins (1990) propose psychological tests as a tool for identification. Their test of personality characteristics and leadership behavior resulted in an accuracy of 84%. Thus, objective indicators can assess IS champion potential. Additionally, Reibenspiess et al. (2022) reported the recognition of previously unremarkable people as champions through a digital platform. Technology has made it possible to increase the range of the identification process. Further examples based on the researchers' creativity are algorithms evaluating curricula vitae, analyzing as well as conducting video interviews and simulated games.

Task. The task component refers to the interpersonal environment. This component can support identifying the IS champion's ability to interact by triggering or observing interactions. Van Laere and Aggestam (2015) identified champions' interactions within their research through participatory observations and interviews. For the observations, one of the authors participated in the project for a more extended period. For the interview, one member of the steering group captured events within the project (van Laere and Aggestam 2015). Their approach indicates the following propositions: The data is collected close to the IS champion in a project environment. The collector may only participate to the extent that they can observe. The interpersonal environment can especially reveal the subject's abilities to network, promote, and work in teams.

Structure. The structure encompasses the organizational environment which improves the identification process. Many studies used peer nominations for identification (Renken and Heeks 2019); the identification may also be based on the opinions of individuals. Furthermore, a flexible and tolerant culture towards IS champions (Reibenspiess et al. 2018) ensures that peer nominators perceive the IS champion's characteristics. Further examples resulting from researchers' brainstorming sessions are an envy-free and a speak-up culture to ensure that peers uncover the IS champion's characteristics.

Actor. The actor in the identification process is the potential IS champion. Therefore, one should search for specific characteristics when targeting the subject. Untrainable characteristics can favor (Howell and Higgins 1990), support, or even be a prerequisite for champions' development (Reibenspiess et al. 2018). Especially in team composition, it is also relevant how these complement other team members' characteristics (van Laere and Aggestam 2015). Therefore, the identifier must know these essential characteristics. As examples serve the traits proposed by Reibenspiess et al. (2018).

A.1.2. The development

Technology. Recognizing an opportunity (Maidique 1980) triggers the champion process. Technology enables the IS champion to find and evaluate an idea by exposing them to ideas in the immediate work environment. The ideas should be

engaging and not overloaded with information. Therefore, only appropriate ideas for the IS champion's interests and expertise should be suggested (Reibenspiess et al. 2022). Additionally, a technological system should provide criteria (Reibenspiess et al. 2022) to evaluate ideas. Such a system can be developed based on the insights of Reibenspiess et al. (2022) and Yan et al. (2018), for example in the form of a digital platform. The IS champion should possess in-depth knowledge of digital innovation, the organizational strategy, and the innovation's context (Renken and Heeks 2019). Technology offers a way to provide knowledge. Potential technological tools are, e.g., forums, wikis, vision boards, and training platforms (e.g., Svahn et al. 2017; Yan et al. 2018).

Task. IS champions prefer collaborative work over working alone. They rely on their network while promoting innovation (Renken and Heeks 2019). Digital innovations are created in heterogeneous teams because of their layered architecture (Yoo et al. 2012). The innovation process is increasingly distributed geographically and across organizational boundaries (Yoo et al. 2012). Therefore, the IS champion's network must be extensive in the digital age. To enable the IS champion to develop such a network, they should have the possibility to meet as many potential stakeholders as possible. The meetings must be designed to build trusting, long-lasting relationships (Reibenspiess et al. 2018). Such interactions are created through informal communication channels (van Laere and Aggestam 2015), workshops on solution options (Svahn et al. 2017), flexible and open workspaces, virtual team building, and networking events inside as well as outside the organization.

Structure. The structure component encompasses the structural facilitation of gathering experience, minimizing obstacles, and community integration. A diverse and extensive career experience eases the promotion of innovation (Renken and Heeks 2019). Thus, a policy encouraging changes in the job responsibilities can support the acquisition of experience, e.g., implemented through job rotations or exchange programs within the organizational network (Reibenspiess et al. 2018).

Ensuring that the organizational environment enables IS champions to operate best minimizes obstacles to the IS champion's activities. The lifecycle of digital innovations is dramatically shortened (Fichman et al. 2014), with a constant search for problem–solution design pairing during the development cycles (Nambisan et al. 2017). Agility supports this pace of development, openness to failure, flexibility, and solution changes during the development (Beath 1991; Yoo et al. 2010; Chan et al. 2019). A policy enabling a certain amount of work time at free disposal supports the balance of formal and championing tasks and champions can develop and engage with ideas (Reibenspiess et al. 2022). Additionally, a structure with few hierarchical levels and decentralized decision-making enables champions (Reibenspiess et al. 2018), since it ensures that IS champions are informally informed about the latest strategic decisions at an early stage, and provides direct influence and autonomy in decision-making. A flat hierarchy also supports the IS champion in developing a network reaching all relevant resource providers (Renken and Heeks 2019).

Additionally, community integration enables the development of the IS champion's network and trains their knowledge and communication skills through constant challenges. One measure constitutes formal innovation challenges.

Innovation challenges were successfully used by Reibenspiess et al. (2020) and Svahn (2017) to foster solution searches on defined problems.

Actor. While the identification process primarily seeks untrainable characteristics (traits), the development focuses on the trainable ones (skills and knowledge (Reibenspiess et al. 2018)). Renken and Heeks (2019) emphasize in this context a transformational leadership style that can be taught through transformational leadership training (Howell and Higgins 1990). The task of translating between innovation and strategy (Renken and Heeks 2019) demands communication skills (Reibenspiess et al. 2018). Additional more detailed requirements can be extracted from the characteristics of digital innovation and its innovation process. Transforming an idea into innovation requires transferring existing knowledge from inside and outside the organization into the innovation process (Kohli and Melville 2019). The digital innovation process and outcome are more geographically distributed across organizations and knowledge resources. Therefore, teams are highly fluid (Yoo et al. 2012). Thus, the IS champion needs networking skills, supportiveness, and intercultural competence (Reibenspiess et al. 2018). One possible measure to train these characteristics might be Scrum Master training, since it promotes these skills and competencies.

Having perceived an idea, the IS champion must evaluate the idea's opportunities (Fichman et al. 2014). The IS champion needs to calculate the risk they and their innovation team are taking (Howell and Shea 2006). That demands knowledge of business analyses. Furthermore, champions challenge and inspire the team by displaying innovative actions (Howell and Higgins 1990). Supporting digital innovation demands the knowledge of design patterns (Nambisan et al. 2017) and the ability to think in layered modular architectures (Svahn et al. 2017; Yoo et al. 2010). Besides technical and organizational knowledge, the IS champion possesses macroenvironmental knowledge (Renken and Heeks 2019). Thereby, the IS champion's learning orientation and innovativeness (Reibenspiess et al. 2018) can be fostered through a solid knowledge base (e.g., Glynn 1996; Hargadon 2002; Mumford et al. 2002). This knowledge can be gained through workshops (Svahn et al. 2017).

A.1.3. The reinforcement

Technology. Technology can extrinsically motivate the IS champion by disseminating information about successful champions. For example, Reibenspiess et al. (2022) developed a system announcing awards for successful champions. These reinforced the champion and aroused interest in the champion role among other employees (Reibenspiess et al. 2022). Another example is a technology-enabled bonus collection program (Benbya and Leidner 2018).

Task. The task component encompasses measures to reinforce the IS champion through (possible) interactions. One way is to give the champion greater freedom for their interactions, such as giving them more free time for champion activities or under-the-table projects (Abetti 1997). Another reinforcement possibility is expanding the champion's network by giving them access to organizational or management networks (Reibenspiess et al. 2018).

Structure. The organizational structure acknowledges the champion's performance by rewarding both the success and failure of the innovation project (Reibenspiess et al. 2018). The use of behavior-based performance appraisals positively influences the champion (Reibenspiess et al. 2018) and, therefore, their reinforcement. Further measures are compensations, "Employee-of-the-month" rewards, conferring formal roles, and behavior-based promotion systems (Reibenspiess et al. 2018; 2022).

Actor. The actor component refers to the aspects that enable actors to reinforce their IS champion behavior independently. Champions learn from their experience and improve their championing skills (van Laere and Aggestam 2015). Learning-oriented individuals focus on seeking new challenges (Dweck and Leggett 1988). Coaching learning orientation might motivate the IS champion to improve their skills with a new project.

A.2 Formative evaluation of design stage I

The artifact that resulted from the first design phase was formatively evaluated. The evaluation provided insights for the second design phase (Vaishnavi and Kuechler 2004). The results allow insights into the problem space, the feasibility of the chosen approach in general, and the feasibility of specific cells of the framework and the solution space, as described in the following.

Problem Space. The experts saw employee innovation as an essential aspect of their business (Experts 3, 4 and 6 form1). Some projects break off because employees do not continue to promote them or because projects bypass official channels (Expert 2, form1). Therefore, several experts acknowledged the importance of champions for digital innovations (Experts 1, 2 and 6, form1). For example, Expert 2 (form1) emphasized the IS champion's motivational effect on other employees inside and outside the innovation projects.

Feasibility. Regarding the feasibility, experts mentioned the comprehensibility, usability, proximity to economic reality, and framework structure. Even though the idea was positively received, the experts felt that the framework had too much text (Experts 2 and 6, form1) and missed a graphical representation (Expert 3, form1). Some distinguished between academics and practitioners as the addressees of the framework (Experts 2 and 6, form1), especially regarding the time needed to understand the framework (Expert 4, form1).

The framework was close to business reality for several experts except regarding some delineations (Experts 3 and 6, form1). "*[It] addresses many of the same points that we implement ourselves with our customers, so from that point of view … that is a confirmation of our work*" (Expert 3, form1). The experts positively embraced both the social and technical dimensions and the champion journey (Experts 1, 3, 4 and 6, form1). However, regarding the sequential order, Expert 6 commented, "*[regarding] development and reinforcement, … reinforce development again and again*" (form1). The division into recommendations for action ("What") and recommendations for implementation ("How") within the sections was positively assessed (Expert 1, form1). Table 7. shows the opinions per cell.

Solution Space. For the solution space, the experts informed about functional and operational constraints and alternative or supplementing solutions. The implementation might face economic constraints. Besides financial resources (Expert 1, form1), its implementation demands capacities and capabilities in HR, leadership, and other teams, e.g., those responsible for the technical implementation (Experts 1 and 6, form1). Especially the required HR expertise is not available in every organization (Experts 3 and 4, form1). From Expert 2's (form1) point of view, it also must be considered whether it is worth taking the IS champions out of the day-to-day business. Expert 3 (form1) saw constraints in the duration it takes to see the successes of the implementation. While "*I can teach someone a technology very quickly, it takes 2 or 3 weeks for them to understand it … behavior and … habits, you can change this in persons only in 2, 3, 4, 5 years*" (Expert 3, form1). Additionally, managers' or other employees' willingness to change and support is needed (Experts 1 and 2, form1). Expert 3 saw especially an issue with owner-managed organizations, where the owners don't want to innovate anymore because the business is running, and they receive a good profit annually (form1).

To address the issues above, the experts suggested alternative or complementary solutions. Several experts asked for specific recommendations for action (Experts 1, 2, 4 and 6, form1). Two experts suggested a scoring system to evaluate the IS champion's development (Experts 3 and 6, form1). Expert 1 (form1) imagined a champion journey with a path of skills, traits, and knowledge. Expert 2 (form1) alternatively considered drivers and several possible development paths leading to goals. Expert 6 (form1) demanded information on the framework's possible application areas and influences, e.g., organization size or industry.

A.3 Design stage II - Framework version for formative evaluation-detailed information

The first design cycle resulted in a draft of a framework for developing IS champions, the documentation of the artifact, and additional insights into the problem and solution space. The evaluation phase of the first cycle showed that the chosen approach addressed the problem but faced constraints in the solution space, especially regarding the feasibility. A significant constraint was the skill set of the person implementing the framework in the organization. From the interviews, it emerged that the potential implementers often work in the technical departments. Some organizations have HR experts who can support them, but the technical department cannot rely on this support in other organizations. The artifact must be usable with a low level of knowledge and quickly understandable for persuasion and use. Therefore, the framework had to be simplified with graphical representations and supplemented by other artifacts.

A two-step approach was chosen to improve the artifact. First, the tabular representation was adapted using the evaluation results of the first design cycle. A graphical representation was then derived from the adapted version to summarize the main elements for practitioners. For this purpose, only the essential information was retained and simplified. The artifact overall then consisted of two elements: the

Table 7 Feedback on the framework cells

Champion journey phase	Comments	Further mentioned examples
Technology		
Identification	Impeded reading flow[a], alternative: giving the IS champion a stage to show that they have IS champion potential, tests are not that practical[b]	Platforms for self-presentation [b], structured interviews [e]
Development	Matching different interests and expertise areas, vertical and horizontal knowledge [a], personalize the flow of information to avoid overload [e]	People development management tool [a], learning platform [a,d], coworking tools, chatting tool [a], webinars [d], workshop animation, videos, podcasts, gamification modules [e]
Reinforcement	Announcement and appreciation are essential, gamification might be effective [b], gamification in the definition excludes more serious organizations[d]	Cards to make gratitude visible[a], success stories [b], blog posts[b,d], gratitude chat channel [e]
Task		
Identification	Interactions in larger groups only applicable with a larger number of applicants [c], relying on people skills when HR skills are lacking [c, d]	Targeted questions to reveal how a person acts [c]
Development	Networking across departments[a]	Regulars' table [a], organization wide events, open talks, idea challenges/ hackathons, random chats, topic channels, social days [e]
Reinforcement	Implementation more realistic during over-time, closeness to the management and more freedom develop automatically, too much time devoted to innovation can be counterproductive [b]	Talking in front of a large audience [b,d]
Structure		
Identification	*None*	Open and appreciative culture [d]
Development	More details needed for application [c], the wording "free space" is not self-explanatory, "agile" leaves room for interpretation [d]	Feedback culture [a], encouraging culture [b], a culture where you are forced to make mistakes [c], change-oriented, adaptable culture, target-oriented culture [d], entrepreneurial culture, supporting culture, responsibility, trust, autonomy [e], mutual support[a, e]
Reinforcement	Compensation alone is not enough for long-term motivation [b, c], employee-of-the-month not implementable when there are many IS champions [e]	Career paths[a], celebrating success [e]

Table 7 (continued)

Champion journey phase	Comments	Further mentioned examples
Actor		
Identification	Provide the interviewer with a questionnaire, involve HR and technical department in the process[a]	Professional experience[c,d]
Development	Planning the target role and the path to it, adapt development measures to the level of the individual, make the IS champion feel that they are not alone, not everything as formal training, "social skills" insufficiently defined [a], no predefinition of development, but let them find their own style [b], depending on the age of the IS champion, not all skills can be trained anymore [c], some skills need to be more detailed to train them (e.g. risk-taking into grit and boldness) [e]	Coaching, mentoring, leadership circle, workshop, learning by doing, communicate values (targeting transformational leadership)[a], methodologies like "Five Why" [c], specialist literature [d], training on strategic thinking, solution making, agility, design methods [e]
Reinforcement	Intrinsic motivation is the only way to keep up motivation over a long period of time[c], enable individual intrinsic motivation (e.g., visibility[e], knowledge sharing, exchange)[a]	Identification[a], purpose[a,d], personal visions[c], promote the organization vision and mission[e]

[a]Expert 1, form1. [b]Expert 2, form1. [c]Expert 3, form1. [d]Expert 4, form1. [e]Expert 6, form1

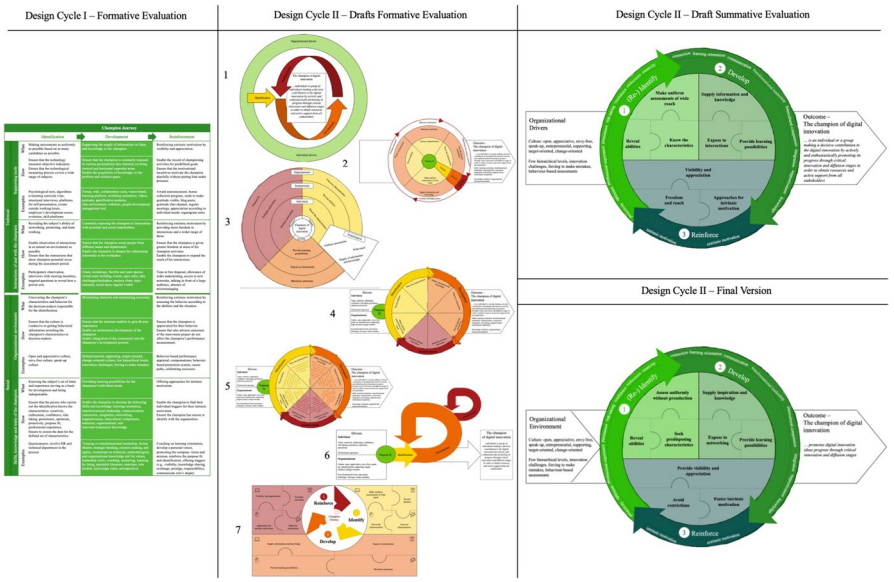

Fig. 8 Evolution of the Framework for the Development of IS Champions. *Note* Draft 1 is an own presentation, draft 2 and draft 3 were adapted from (Doughnut Economics Action Lab (DEAL), 2021), draft 4 and draft 5 were adapted from (pslides ndIntegrated talent management model for PowerPoint. Pslides. https://pslides.com/templates/integrated-talentmanagement-model-for-powerpoint/), draft 6 was adapted from (EnableChange 2021), and draft 7 was adapted from (Muther 2002, p. 12; Osterwalder 2004, p. 66). The figure is used to show the graphical evolution

detailed tabular representation and the graphical representation. Figure 8 shows the evolution and the final version of the framework.

Revision of the Detailed Tabular Representation. There were no objections in the interviews regarding the dimensions of STS theory components and the champion journey. Therefore, the revision focused on the cells. The experts' statements that could be directly applied to the cells, such as additional examples, were inserted in this development phase and are not explained further. Table 8 summarizes all changes made based on experts' suggestions.

Graphical Representation of the Framework: Insights from the first design cycle indicated the need for an easy-to-grasp presentation as a framework for developing IS champions. Therefore, a short text (Experts 6 and 2, form1) and a graphical presentation were required (Expert 3, form1). For the evaluation – and thereby of relevance for the development – March and Smith (1995) propose the following criteria: fidelity of real-world phenomena, completeness, level of detail, robustness, and internal consistency. The framework should be designed to cover the various circumstances in organizations. The level of detail must be consistent throughout the framework without losing completeness.

The detailed tabular representation from the first design cycle has five building blocks: the champion journey, the STS theory components, the recommendations of action ("What"), the recommendations for implementation ("How"), and the examples. The experts especially valued the champion journey and the split between

Table 8 Revision of the detailed tabular representation

Champion journey phase	Comments
Technology	
Identification	"Algorithms for analyzing (and conducting) video interviews" and "simulated games" resulted from the brainstorming of the authors and were not empirically proven. As the experts did not mention those, these were omitted. Especially the simulated games may be a subcategory of psychological tests. Expert 2 (form1) did not consider psychological tests practical and thereby contradicted Expert 6 (form1), who mentioned them as an example. Accordingly, they stayed in the examples. The recommendation for action were reworded for better readability (Expert 1, form1).
Development	"Ensure that the champion is constantly exposed to various ideas matching his interest and expertise areas" was confirmed by Expert 6 (form1), who otherwise saw an information overload. Expert 1 (form1), however, valued horizontal and vertical knowledge transfer and demanded ideas "matching different interests and expertise areas" (Expert 1, form1). Therefore, the two formulations were merged into one.
Reinforcement	Gamification was eliminated from the recommendation for action to emphasize more precisely what extrinsically motivates the IS champion. With the inclusion of "visibility and appreciation," the other examples are also encompassed.
Task	
Identification	Three experts stated that they do would not include group interaction in the identification process. Expert 2 (form1) did not consider it purposeful. Expert 3 and Expert 4 (form1) lack the number of applicants and the ability to conduct such group interactions. Therefore, the recommendation for action and the recommendations for implementation were formulated somewhat less specifically in terms of group interactions.
Development	The wording "working from each layer involved in digital innovation" was simplified to "from different teams and departments".
Reinforcement	None
Structure	
Identification	The wording "Flexible and tolerant culture towards the champion" was changed to the wording used by Expert 4 (form1).
Development	Expert 3 (form1) stated that he would detail some examples. It can be deduced from this that head categories are meaningful enough to be interpreted by the user if necessary. Therefore, entrepreneurial culture summarizes the examples of policy supporting work time at free disposal, agile culture, responsibility, trust, and autonomy in the spirit of this very holistic framework. Supporting culture summarizes feedback culture, encouraging culture, supporting culture, and mutual support. Change-oriented culture summarizes adaptable and policy encouraging changes in activities. This summary additionally addressed criticism regarding working time regulations by Expert 2 (form1). Furthermore, the phrases "agile" and "free space" (Expert 4, form1) were replaced with "autonomy".

Table 8 (continued)

Champion journey phase	Comments
Reinforcement	"On behavior and an appropriate culture of failure" was reformulated to "behavior according to the abilities and the situation". Thereby, it describes more clearly how the IS champion is assessed. "Enable a behavior-based rewarding system" was reformulated to "Ensure that the champion is appreciated for their behavior" to consider in the comment that money is not essential (Experts 2 and 3, form1). The example "employee-of-the-month" reward was replaced by celebrating success because the reward focuses too much on individuals (Expert 6, form1) and thus disregards the definition of the IS champion as a group. "Confer more formal roles" was replaced by career paths. "Career paths" is more general and does not directly imply creating a formal role but can also mean progressing along other career paths. It thus meets the literature's assessment that formal roles are counterproductive (Howell and Higgins 1990) and the assessment of the expert that full-time innovation is not efficient (Expert 2, form1).
Actor	
Identification	In the first version of the framework, the traits were listed under examples. After re-examination, the naming under the recommendations for implementation analogous to Actor – Development seemed to make more sense. Professional experience was also added to the requirements. Although this is not a trait, two experts found it relevant (Experts 3 and 4, form1), and one named a requirement of more than ten years of professional experience (Expert 3, form1). Accordingly, the recommended measures for identifying these characteristics were included as examples.
Development	The recommendation for action was changed to address the demand for levels (Expert 1, form1), autonomy in finding the IS champion's style (Expert 2, form1), and possible constraints (Expert 3, form1). "Learning" instead of "training" implies that not everything has to be formally trained. "Social skills" was divided into communication, connection, and integration, which makes the meaning of the term clearer. Networking was combined with connection to avoid overlap of skills. Other skills were not detailed for the sake of clarity.
Reinforcement	The recommendations for action and recommendations for implementation were changed to clarify that intrinsic motivation is not externally generated. In addition, the focus on learning orientation was removed because it did not correspond to the intrinsic motivation possibilities according to the results of the evaluation phase.

social and technical aspects (Experts 1, 3, 4 and 6, form1). However, one expert suggested that development and reinforcement are less sequential and more cyclic (Expert 6, form1). Moreover, the champion journey phases, and the STS theory components cannot always be delineated (Expert 6, form1). In addition, complicated technical terms contribute to the resistance of the users (Expert 6, form1). Table 9 gives an overview of the considered requirements for each draft of a graphically enhanced framework.

A.4 Formative evaluation of design stage II

The second formative evaluation aimed at improving the framework's graphical representation. For this purpose, the experts evaluated six (Expert 2, form2) to seven (Expert 1, form2) representation alternatives (see Fig. 8). The results of the evaluation allowed us to gain insights into the level of detail, feasibility, and completeness of the representation. In addition, Expert 1 (form2) gave further indications about the solution space.

Level of Detail. Expert 1 (form2) deemed the level of detail in the fourth alternative appropriate. "*I think this is clearly arranged, … also with the color variants, so that you can see … that it … belongs together*" (Expert 1, form2). This alternative contains the champion journey, the recommendations for action, and the IS champion definition. However, Expert 2 (form2) still felt there was too much text in the illustration alternatives. The experts needed more information than only the champion journey phases (Experts 1 and 2, form2). In their opinion, the components (Expert 1, form2) and the examples (Experts 1 and 2, form2) are too detailed. The recommendations for implementation were not mentioned. Both suggested supplementing the artifact with a detailed tabular representation and examples for reference (Experts 1 and 2, form2). "*I thought … [the detailed tabular representation] was quite good in its comprehensiveness. And … also not entirely dissimilar to those I have made for myself*" (Expert 1, form2).

Feasibility. The feasibility of individual alternatives provides further insight into representation requirements. For the most part, the experts are used to significantly reduced frameworks (Experts 1 and 2, form2). Both experts needed an illustrated process as they had trouble with the third alternative (Expert 1, form2) and the seventh alternative (Expert 2, form2). Expert 2 (form2) tried to assign more meaning to the colors than just serving clarity and therefore had problems understanding the colors. Expert 1 (form2) had problems with the wedge (second and third alternative) and the readability of the recommendations for action. Development and reinforcement overlap rather than strictly follow each other. A positive aspect of the seventh alternative was clarifying the big picture through the puzzle pieces (Expert 1, form2). Both experts favored the fourth alternative; they were able to apply the framework at the given level of detail but could not fill the exemplar implementation with more detail (Experts 1 and 2, form2).

Completeness. Expert 1 (form2) reported that the reidentification was missing to complete the champion journey. Expert 2 (form2) wondered how often the cycle should be repeated, while this was not generally definable for Expert 1 (form2). As an alternative, Expert 1 (form2) suggested milestones. Both experts suggested omitting the purpose fit for logical completeness (Experts 1 and 2, form2). The examples should also be excluded from the framework because the list of examples never reaches completeness (Expert 2, form2). Expert 2 (form2) felt that the framework, in general, was not complete without an explanatory text.

Solution space. Expert 1 (form2) needed to know the IS champion to implement the framework in detail. She wanted to implement the framework in individually tailored sets of measures. As a complementary artifact, she suggested a template that

Table 9 Requirements implemented for the different drafts of the graphical representation of the framework

ID	Included building blocks	Implementation of further requirements
1	Champion journey	Development and reinforcement are less sequential and more cyclic, know the drivers of the champion journey, elusiveness of the IS champion concept
2	Champion journey, STS theory components, recommendation for action	Purpose is essential, elusiveness of the IS champion concept
3	Champion journey, STS theory components, recommendation for action	Unclear delineation of technological means per champion journey phase
4	Champion journey, recommendation for action	Purpose is essential, elusiveness of the IS champion concept, unclear delineation of structural means per champion journey phase
5	Champion journey, recommendation for action, examples	Purpose is essential, elusiveness of the IS champion concept, unclear delineation of structural means per champion journey phase
6	Champion journey	Elusiveness of the IS champion concept, unclear delineation of structural means per champion journey phase
7	Champion journey, STS theory components, recommendation for action	Adjustment based on the interview with Expert 2 (form2)

The requirements in the column "Implementation of further requirements" are derived from the formative evaluation of design stage I (see section A.2)

organizes the documentation of the measures and creates comparability between IS champions.

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