# A process for selection and training of super-users for ERP implementation projects

**Peter Danielsen** *pedin@vestas.com*
*Aarhus University, School of Business and Social Sciences*
*Aarhus, Denmark*

**Kenneth Sandfeld Hansen** *sandfeld.hansen@gmail.com*
*Aarhus University, School of Business and Social Sciences*
*Aarhus, Denmark*

**Mads Helt** *madshelt@gmail.com*
*Aarhus University, School of Business and Social Sciences*
*Aarhus, Denmark*

**Lasse Holm Nielsen** *lasseholmnielsen@gmail.com*
*Aarhus University, School of Business and Social Sciences*
*Aarhus, Denmark*

**Nikolaus Obwegeser** *nikolaus@mgmt.au.dk*
*Aarhus University, School of Business and Social Sciences*
*Aarhus, Denmark*

**Abstract**

The concept of super-users as a means to facilitate ERP implementation projects has recently taken a foothold in practice, but is still largely overlooked in research. In particular, little is known about the selection and training processes required to successfully develop skilled super-users in practice. To address this research gap, we analyze the case of an ERP implementation program at a large manufacturing company. We combine Katz's widely accepted skill measurement model with the process observed in practice to describe and test a model of super-user selection and training. The resulting model contains a systematic process of super-user development and highlights the specific skillsets required in different phases of the selection and training process. Our results from a comparative assessment of management expectations and super-user skills in the ERP program show that the model can be successfully applied and thus serve as a template for practitioners confronted with similar challenges.
**Keywords:** ERP implementation, super-user, key-user, skills.

## 1. Introduction

The implementation of Enterprise resource planning (ERP) systems is generally considered a complex undertaking for many organizations. Aiming to provide enterprise-wide integration of business processes, ERP systems are cross-functional by nature. ERP implementation projects therefore require the management of a complex combination of technical, organizational, and environmental aspects. A commonly mentioned challenge are the knowledge-exchange processes between the main project stakeholders involved - experts, consultants, and end-users. To support optimal knowledge flow among these stakeholders and

eventually facilitate system adoption by the end-user, the role of super-users has been introduced to ERP implementation projects.

Super-users (also referred to as key-users, expert-users, or power-users) can be defined as users with expert knowledge with regard to a particular system or processes. In both theory and practice, super-users have been utilized in two different ways to support ERP implementation projects. Firstly, and outward- facing, they can support the provision of knowledge regarding internal business processes to the ERP project team, thereby helping to develop the requirement specifications, and to support the customization and implementation planning process [22]. Secondly, inward-facing, super-users can be utilized as system-related knowledge-hubs to facilitate training and support to the end-users, during and after the implementation of a system [18]. In this paper, we are interested in the second perspective, with a particular focus on the selection and training processes required to develop super-users for the training and support of end-users. Prior studies recognize that the role of a super-user requires a particular combination of technical, human, and conceptual skills [10]. In practice however, many organizations struggle to develop personnel with such skillsets [11].

While the link between the super-user concept and ERP implementation success has been established [11], little is known regarding the processes that can guide organizations in practice to successfully develop (select and train) skilled super-users. Thus, in order to further advance our understanding of the super-user concept, we formulated the following research question: how can organizations select and train skilled super-users for IS implementation projects?

## 2. Theoretical background

The motivation for our research is grounded in the positive effects that super-users may have on ERP implementation success. To build on existing knowledge, we conducted a thorough search for all academic and non-academic literature related to super-users. We followed a broad search pattern on multiple databases, including Google, Google Scholar and Scopus. To avoid the incommensurability trap we used different variations of keywords that potentially capture the same or similar concepts, such as key-users, power-users, or expert-users (in the remainder of this article, these concepts are used synonymously). In line with recent studies, our search revealed that only little research has yet addressed this concept from an academic perspective, and that existing studies are fragmented [15, 17]. Most literature and online publications found in trade journals and non-scientific publications are largely normative and lack proper descriptions of their methodology and evidence for the claims made. This situation is common to practitioner-driven fields such as IS implementation and development, and may lead to a lack of theoretical currency that requires critical scientific investigation of the phenomenon at hand [1].

Prior studies have looked at the role of super-users in IS implementation from two different perspectives, depending on the phase of the implementation project [12].

First, related to project chartering and actual implementation phase, some studies investigated the role of the key-user as experts on internal business processes, thus focusing on the relationship between vendor (consulting) and client-organizations. From this perspective, early involvement in the project, system and contractor quality, as well as satisfaction of key-users' expectations can be influential to the overall success of the project [22, 23].

Second, related to the shakedown and improvement phases, key-users can be used as internal contact points to provide training and support to the end-users of the system. In this role, key-user have been shown to facilitate the complex knowledge-sharing processes required in implementation projects [6, 8], by taking the role of boundary spanners between experts and end-users [17, 18].

With this article, we focus particularly on the skills required for super-users to act as facilitators between experts and end-users, as well as the processes for selection and training of super-users. [10] were the first to investigate the particular set of skills necessary for super-users. The authors relied on the widely used skill framework by [7] - grouped into technical,

human, and conceptual skills - to develop an augmented model of 22 unique skills. The participants of their survey considered human and conceptual skills the most vital skills for super-users, due to their role as change agents and facilitators among various stakeholder groups during the implementation process. Interestingly, their study also shows that all participating companies reported significant skill gaps in their super-user personnel.

Using the same skill measurement model, [11] continue [10]'s research with the goal to more objectively assess the influence of different skill groups on ERP implementation success, in the form of a direct link between the three types of skills and the success of ERP implementation projects. Their analysis shows that both technical and human skills are significantly related to the success of the ERP implementation, while no significant effect was found for conceptual skills.

[15] show that super-users can act as boundary spanners across three distinct knowledge boundaries that influence successful ERP adoption: structural, social, and cognitive boundaries. To do so, the role of the super-users has to comprise different components, including expert, collaborative, and educational components.

In summary, existing research found a diverse number of super-user skills that are required for the successful application in ERP implementation projects. Interestingly, the existing body of knowledge indicates that the importance of different skills may dynamically change according to the current phase of the implementation or adoption process. However, a consolidated model that links the importance of different skills to (i) phases of the implementation process or to (ii) the selection and training process of super-users is yet missing.

## 3. Research design

In this article the case study approach is used as a research strategy [4, 24] to investigate the phenomenon of interest within its real life context using multiple sources of evidence [20]. We relied on mixed data collection techniques, comprising both qualitative and quantitative data, as it allowed us to obtain a more complete picture of the case [24].

Table 1: Overview of data sources

| Type | Description | Objective | Nature of data |
|---|---|---|---|
| **Interviews** | Interviews with key personnel | Deep understanding of the project and the role of the super-user. | Qualitative |
| **Internal documents and plans** | Project plans, reports, etc. | Supporting material. | Qualitative |
| **Publicly accessible documents and articles** | Press releases, interviews/articles about the project in trade magazines. | Supporting material. | Qualitative |
| **Skill-questionnaire** | Questionnaires based on Katz's skill framework administered to experts and super-users for comparative assessment. | Measurement and test of required versus achieved skills of super-users. | Quantitative |

### 3.1. Qualitative data – selection and training process

We conducted three interviews with key personnel of the ERP project, including the Chief Project Manager and a Change Manager. These interviews helped us to get an overall understanding from the management perspective, including the top-management perspective from the program manager as well as the operational project perspective from the change

manager in charge. In addition, we had free access to all project related documentation, including implementation and training plans.

Table 2: Overview of interview respondents

| Respondent | Title/Role | Date of | Purpose | Type |
|---|---|---|---|---|
| **KL** | Chief Project Manager | 20/10-2016 | Get initial understanding for the overall project, discussion of project plan and reports. | Unstructured, explorative |
| **AA** | Change Manager | 16/11-2016 | Super-user selection and training process. Preparation of survey. | Semi-structured |
| **AA** | Change Manager | 08/12-2016 | Super-user selection and training. Discussion of survey results. | Semi-structured (online) |

### 3.2. Quantitative data – skill measurement

To allow for a comparative assessment of desired and actual skills, as well as to test the super-user selection and training process applied in the project, we administered a standardized skill measurement survey to both a group of experts and the super-users working at production facilities that had already finished the system implementation. Our primary objective was to conduct a comparative skill assessment of the super-users in order to assess the importance of the skills and the corresponding skill-level. To do so, we build on prior research that investigated super-user skills [10, 11] and rely on Katz's widely used classification scheme that differentiates between technical, human, and conceptual skills [7].

Table 3: Survey items developed for the study of skill importance and achievement, based on [7, 10]

| Code | How will you rate [your / the importance of the super-user's] … | T | H | C |
|---|---|---|---|---|
| **TC1** | Ability to effectively plan and manage his/her time? | X | | X |
| **TC2** | General business process knowledge? | X | | X |
| **T1** | Ability to adopt and learn new technologies? | X | | |
| **T2** | General ERP knowledge and skills? | X | | |
| **T3** | English language skills? | X | | |
| **T4** | General computer/IT skills? | X | | |
| **TH1** | Teaching and training skills? | X | X | |
| **H1** | Ability to negotiate and handle conflicts (for example if there are disagreements between you and the end-users?) | | X | |
| **H2** | Ability to influence, motivate and direct end-users? | | X | |
| **H3** | Ability to work in a team? | | X | |
| **H4** | Ability to form and maintain working relationships with their co-workers? | | X | |
| **H5** | Ability to find creative solutions to any issues the Super-User may encounter? | | X | |
| **HC1** | Ability to manage change resistance? (for example if the end-users resist to adopt the new system) | | X | X |
| **C1** | Ability to structure and plan his/her work towards a long-term goal? | | | X |
| **C2** | Ability to handle a crisis? (for example if the new causes a production stop) | | | X |
| **C3** | Ability to define, determine, evaluate and select among different solutions to a specific problem? | | | X |
| **THC** | Ability to coordinate and organize the daily tasks? | X | X | X |

**Technical skills** refer to the understanding of a specific kind of activity, which involves specialized knowledge, analytical ability within that specialty, and experience with the use of tools and techniques of the specific discipline. An example of a technical skill that is relatively easy to visualize could be a surgeons ability to perform a certain surgery - this requires both specialized knowledge, analytical ability and experience with the tools and techniques. This skill area is the most concrete and thus perhaps the most familiar as most on-the-job training usually focuses on developing these technical skills [7].

**Human skills** characterize a person's ability to work effectively in a group and to build cooperative effort within a team. As opposed to technical skills, which focus on people's ability to use technology or physical artifacts, human skills are primarily concerned with working with people. An executive with highly developed human skills is able to accept viewpoints, perceptions and beliefs which are different from his/her own, and is equally skilled in communicating what is meant by his/her own behavior [7].

**Conceptual skills** are described as "*the sensing of the organization as a whole and of the total situation relevant to it"* [2]. This includes both recognizing how different functions of an organization depend on each other, and how a change in one part of the organization will affect the other parts. If this skillset is highly developed, a person should be able to keep-in-mind and advance the over-all welfare of the organization, and not just their immediate work environment.

Overall, human, conceptual and technical skills are closely interrelated and it's difficult to determine where one of the skills ends and another begins [7].

To apply the framework in practice, we developed a survey tool comprising 17 questions. The respondents were asked to rate the importance of each of the 17 skills on a Likert scale from 1-7, providing an ordinal-level measure of their attitude [16]. A value of 1 indicates "Not at all important" whereas 7 indicates "Extremely important".

The group of experts was asked to evaluate the importance of each skill ("Please rate the importance of the super-users ability to …"), while the super-users were asked to evaluate their own competences ("Please rate your ability to …").

## 4. Case analysis and results

This section will first introduce the reader to the case company and the ERP program to set the baseline for the analysis thereafter. Data from both qualitative and quantitative sources is used to outline the selection and training process related to the implementation methodology applied in the project, as well as the assessment of skills by experts and super-users.

### 4.1. The ERP program

ManuComp is a Danish manufacturing firm with a revenue of around 10.2 billion euro in 2016. Starting in November 2014, ManuComp began rolling-out the ERP system to all of their production facilities. This program was aptly named OneERP, as it aims to standardize the ERP system across more than 20 production facilities spread across eight countries.

OneERP's goal is a "one-2-one – like-for-like" replacement of the prior ERP system. To make sure all factories implement the same core features of the system, the program uses a standardized implementation template for all factories. To adjust for different requirements among factories, the program will enter a phase of customization and enhancement after successful implementation of the system at all production sites. Thus, the OneERP program consists of two major phases, implementation and modification.

This article focuses on the implementation phase, which comprises 5 sub-phases: "Mobilize", "Solution Validation", "Prepare", "GO-LIVE" and "Stabilize". OneERP is organized in different teams consisting of the OneERP team, a factory team, a roll-out team, and a data migration team. The OneERP team is considered as the management team of the overall program with the responsibility to deliver a successful rollout of the system to all factories.

### Mobilization

In the first phase of the OneERP roll-out methodology - the mobilization phase - the OneERP management team presents the overall project to the local production facility management (PFM). This phase is considered as on-boarding of local management with the objective to ensure that the PFM takes ownership of the project. The on-boarding process consists of a 2-day workshop held by the OneERP Management team. As a part of this process, the PFM is given an in-depth introduction to the super-user concept, as well as the task to identify potential super-users within two weeks. An examination of the initial draft of potential super-users takes place in the third week, where the OneERP management team provides the PFM with feedback regarding their choices, before the final choice is made collectively.

### Solution validation

The second phase - solution validation - consists of three sub-phases. The first sub-phase is a super-user briefing session. This session is a joint skype-meeting for all selected super-users, containing an introduction to the role as a super-user, the corresponding responsibilities and the self-training activities. ManuComp's perspective of the super-user concept is that it is a long-term investment where the super-users are considered as a valuable asset in ensuring a successful transition, both during the implementation and after the GO-LIVE phase. Change manager AA commented that *"the whole super-user concept is very costly, but we believe that benefits tied to the concept exceed these costs."*

The second sub-phase is related to self-training activities. ManuComp maintains an internal collection of online training material, which contains approximately 500 training videos allocated into two main streams. The two main streams contain a) review videos, which are short (1-2 minutes) videos providing the super-user with a general insight into new processes, and b) essential videos with instructions about specific daily functions, e.g. how to print. At the end of each completed training category, the super-users must complete a test within four weeks. The OneERP Management team tracks the super-user's completion ratio of videos and their scores during the self-planning activities.

The third sub-phase is a 2-day workshop with the PFM and all super-users, organized by the OneERP Management team. The objective of the workshop is to validate whether the production facility can execute its tasks by using the new system and the system functionalities. ManuComp's approach towards this workshop is that the workshop is not considered as a two-day technical training camp, but more as a knowledge transferring camp. Change manager AA describes that "*the workshop works as a two-ways communication where the super-users have the task to identify potential changes in ways-of-working and ways-of-organizing"*. ManuComp wants the super-users to take ownership and share knowledge with each other. As part of the workshop, a change impact assessment is carried out to assess how the system will affect the local work processes and procedures. This is intended as a means to identify and eliminate existing workarounds and process deviations, and is mainly driven by the super-users, as they possess the necessary conceptual knowledge.

### Preparation

In the preparation phase, 14 days of intensive classroom training is carried out with the aim to teach and train the super-users in the new system. This training program is instructed by the roll-out management team through face-to-face interaction. The training consists of presentations, exercises, tests. Primarily, the training concentrates on process related topics so that the super-users understand how the system affects the production facility processes. Hereafter, the rollout management carry out more functional related classroom training based on the change impact assessment in the previous phase. After the completion of classroom training, a user-acceptance test is conducted with the aim to test the new super-users' skills regarding the new system. The super-users are given several tasks to complete to simulate real

life situations. This test aims to provide the hands-on experience that is necessary to get fully acquainted with the new system.

### GO-LIVE

The GO-LIVE phase contains the final training of the super-users as well as initial training of end-users. The GO-LIVE phase is planned for four weeks. The first two weeks aim to finalize super-user training, allowing the consultants and the OneERP roll-out team to customize the last part of the training to each individual super-user, depending on which area the super-user has the lowest competence level.

After two weeks, the actual end-user training starts. The end-user training is divided into two streams, namely classroom training and shop-floor training. The classroom training is designed as multiple training sessions facilitated by the super-users. This training focuses on the more advanced parts of the system. The shop-floor training occurs at the production floor where the super-users, at each team shift, introduce the end-users in a hands-on fashion to the basic functionalities of the new system (e.g., clocking in). In both streams, the consultants and OneERP roll-out team work as observers. In case of any questions or problems that the super-user cannot handle, the consultants provide back-up support.

### Stabilize

After the system has been successfully implemented at the production facility, the project enters the stabilization phase. The super-user is the first point of contact if errors regarding the new system occur or end-users are not able to execute operations. If the super-user is not capable of handling the error, he/she gets in contact with the roll-out management team for assistance. This procedure remains in place until the majority of issues have been solved, which can take up to four weeks after GO-LIVE. Thereafter, the roll-out management is officially shut-down, putting the super-users alone in charge of local problem-solving, with access to further assistance from a centralized IT support desk.

### Post-implementation activities

ManuComp has established a set of virtual network communities for the super-users with the aim to stimulate cross-sectional knowledge sharing. Firstly, a community-of-practice to share and learn functionalities of the new system has been developed. The community-of-practice is a platform to embrace inquisitiveness and openness with the objective to accelerate the development and usage of the new system. For each process stream, a community group is set up and monthly meetings to discuss open issues are arranged. Secondly, a social network and cooperation tool is set up for daily usage across streams and production facilities. Using this platform, super-users can ask questions, share links and publish tips-and-tricks videos.

## 4.2. Super-users in the project environment

As follows from the analysis of the roll-out methodology, the super-user concept is an integrated part of the OneERP roll-out methodology with the objective to ensure a successful implementation. In line with their rollout methodology, ManuComp has established the following six primary responsibilities of a super-user: (1) participate in the solution validation workshop and help evaluate that OneERP solution is durable on the factory, (2) participate in User Acceptance Test, (3) support go-live preparation activities and help quality assure all aspects of the implementation, (4) training of end-users and (5) to be the first point of contact for end-user issues after GO-LIVE, (6) report suggestions for enhancement functionalities in the modification phase.

Super-users are considered as a crucial element during both implementation and modification phases, to act as a link between the project team, consultants and end-users. After the selection process, super-users receive intensive training in the new ERP system in

order to be able to pass on their learning to end-users. super-users are designed to act as connection bridge between the different stakeholders involved.

## 5. Skills involved in super-user selection and training

In this study, we are particularly interested in revealing the different skillsets in focus at different stages of the selection and training process, as well as in the effectiveness of the overall process to develop skilled super-users. To better visualize the process, Figure 1 shows an overview of the super-user selection and development process with respect to the different phases of the implementation project, as well as the training activities and skill-areas at focus. In the remainder of this chapter, we present the relationship between the activities performed at each stage of the process and related it to the respective skill area being developed.

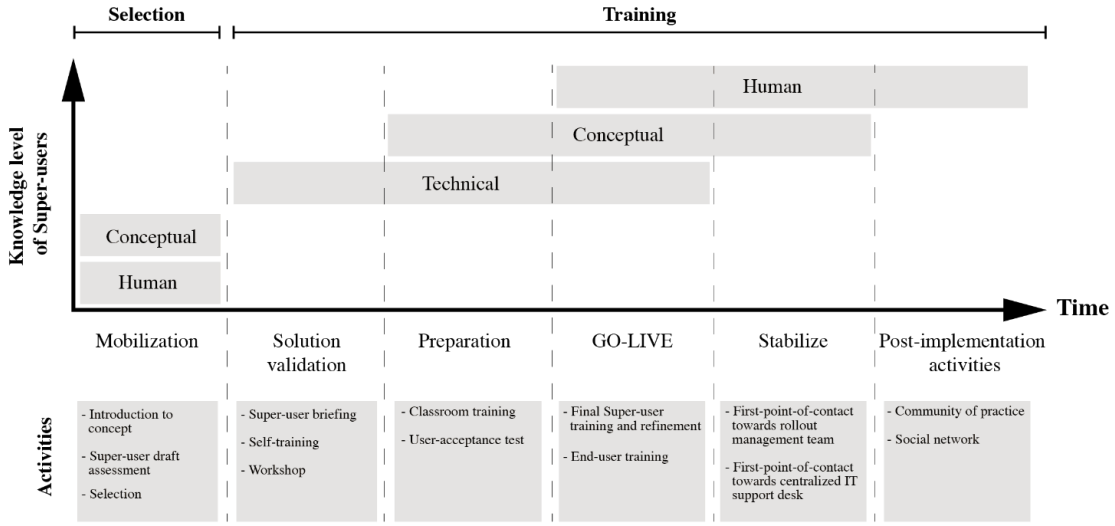


Figure 1: Overview of activities, skills and implementation phases

### 5.1. Selection process

Based on prior experiences, ManuComp has developed seven criteria regarding the capabilities that a potential super-user must possess in order to be selected. These criteria are: (1) a trusted and well-liked colleague, (2) solid business and operational knowledge, (3) comfortable with both processes and IT systems, (4) quick learner not afraid to try out new things, (5) good communicator that likes to help, demonstrate and teach others, (6) proactive and eager to stay updated and "on top" of processes and IT systems and final (7) trouble shooter that likes to eliminate both problems and root-causes. Interestingly, when comparing Katz' classification of skills and the related 17 skill questions with ManuComp's seven criteria of super-user selection, some similarities become apparent.

The first criterion (1) matches the leadership, team skills and relations questions, being concerned with working with people and human skills. More concretely, it is the way that end-user perceive a super-user that demonstrates the human classification skill [7].

The second criterion (2) matches the business process knowledge and decision-making questions to the extent that these cover the conceptual classification skill of recognizing how the various functions and processes of the productions facilities depend on one another. This match further triangulates with the statement in the first interview: *"We cannot use an employee (super-user) with only two months of experience. You must have been on the production facility for several years and not just knowing your own business area, but be familiar with the interface of other business areas so you can be connected and involved in others work"* - (Change manager AA)

The third criterion (3) matches the adoption of technology, crisis handling, ERP knowledge, computer skills and business process knowledge questions and thus relates to both the technical and conceptual skill classifications. The technical skill classification includes both the ability to adopt technology, general ERP knowledge and computer skills. However, crisis handling ability and business process knowledge questions are captured in the conceptual skill classification, since one of the abilities of the conceptual skill classification is to recognize over-all relationships of processes and significance of a change. If this recognition is present, a super-user is more effective in managing change and conflicts that may arise [7].

The fourth criterion (4) matches the adoption of technology, language, computer skills and creativity questions and is mostly captured within the technical skill are. This includes specialized knowledge, analytical skills, and know-how related to the use of tools and techniques [7]. The creativity aspects however relate to the human skill classification [10].

The fifth criterion (5) relates to negotiation and conflict management, teaching and training, leadership and relations skills. Common for these aspects is that they are mainly linked through human skills, as they focus on the social interaction. To be a good communicator, a super-user must accept viewpoints, perceptions and beliefs that are different from his own [7]. This creates a foundation to better understand what others mean and a breeding ground for the super-user to communicate with others, in their own context [7]. Furthermore, a super-user with good human skills tends to create an atmosphere of approval and security, whereby subordinates can express themselves without fear and feel free to participate [7].

The sixth (6) criterion deals with the ability to take action by causing change, instead of reacting to change, in relation to business processes and IT systems. While there is no direct equivalent in Katz's skill framework, it can arguably be seen as an intrinsic desire within conceptual and technical skills [10].

The seventh (7) criterion relates to negotiation and conflict management, crisis handling and creativity skills, and is mainly related to conceptual and human skill areas. Since super-user become the first point of contact for end-users post-implementation, challenges and problems that may arise should be tackled by the super-user. By having a good understanding of the business processes, unexpected incidents can be handled by the super-user without the need for external support [7].

In addition to the seven super-user selection criteria, an eight criterion was identified during the first interview with change manager AA. Based on previous experience, ManuComp has adjusted the concept of the super-user to the extent that a super-user must be at the same hierarchical level as the end-users in order to ensure a high degree of knowledge transfer

*"Previously, we have tried out a concept with middle-managers in the super-user role. This did definitely not work so we had to reorganize and point out new super-users on the same hierarchical level as the end-users"* - (Change manager AA)

ManuComp's adjustment is consistent with Katz' perception of the administrator criteria, since the skills of a sufficient administrator depends on the organizational hierarchical level [7]. ManuComp's approach towards the selection of super-users embraces the human and conceptual skills as the most important skills to possess in advance, whereas the technical aspect are not given the same attention. For ManuComp, the technical skillset does not play a crucial role in the selection process, as these skills are expected to be easier to train during the roll-out phases: *"The selection criteria are developed from our perception of which skills are the most important to already posses as a super-user [at ManuComp] and human criteria are most essential since technical skills are more trainable"* - (Change manager AA)

### 5.2. Training process

During the phases of the implementation, ManuComp has dedicated training activities assigned to each stage, starting after the initial mobilization phase in which the potential super

users are selected. This structured approach towards the training of the super-users' skills aims to ensure a more rapid development than through unorganized training [7].

In the solution validation phase, the training plan consists of self-training activities and a final workshop. The self-training activities ensure that all super-users reach a minimum level of the required technical skillsets necessary at the operational level [7]. The final workshop however is centered on building a common understanding and knowledge sharing. [9] consider knowledge to be the most important resource of an enterprise. The workshops aims to increase learning at both the individual and organizational level, as it is of prime importance in creating a shared understanding [5, 13, 19].

In the preparation phase, the training activities especially focus on the conceptual and technical skills through functional related tasks. The user-acceptance test is a way of testing the solution, which improves the super-users' technical skills. The critical part of communicating the purpose of the new system (why), the process-related change that arise due to the new system (how) and the technical and functional tasks that the super-users should are trained in (what), will impact all skill classifications, given the holistic view of the dynamics on the production facility. Moreover, the communication part embraces the human classification skills, since super-users are expected to interact and work with people with different viewpoints and perceptions [10]. By sharing and learning through communication, an atmosphere of approval and security is encouraged. This atmosphere is what the super-users should be able to create when they transfer their knowledge to the end-users.

In the Go-live phase, external consultants and the OneERP roll-out management team train, advice and supervise the super-users in how to present, act and communicate the training to the end-users. This is followed by a training of the super-users' presentation and communication skills. At this stage, it is required that the technical skills are at the expected level, as the super-users have to begin training the end-users.

With the beginning of the stabilization phase, the super-user acts as the filter for all problems that are reported from end-users and the centralized IT support desk. In addition to the technical and conceptual aspects related to the occurring problem, the super-user must have an ability to both explicitly and implicitly understand the problem that end-users are trying to communicate, as well as the ability to successfully manage the solution process with all involved stakeholders. Thus, the super-users directly influences the performance of end-users on the system.

### 5.3. Comparative skill analysis

To validate the achievement of the designated responsibilities as well as the selection and training process outlined above, we distributed a standardized skill questionnaire to both (i) experts and change managers involved in the design and management of the super-user process, and (ii) the super-users themselves (see Table 3).

For the expert group, change manager AA facilitated the selection of qualified respondents and the distribution of the surveys. The group of experts consisted of internal and external consultants, as well as internal specialists. The survey was conducted anonymously, to increase truthful responses. Thus, no information can be given with regard to their actual role in the project. Overall, we received 17 responses from our sample of 28 respondents, indicating a satisfactory response rate of 61%. Simultaneously, the same questionnaire was distributed to a group of super-users, including three additional control variables of demographic character. In collaboration with AA, the survey was distributed to super-users in production facilities that had already implemented the new ERP system. We received 27 responses out 56 super-users, indicating a response rate of 47%.

Table 4: Mean survey results for experts and super-users

| Code | TC1 | TC2 | T1 | T2 | T3 | T4 | TH1 | H1 | H2 | H3 | H4 | H5 | HC1 | C1 | C2 | C3 | THC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Experts (mean)** | 5,6 | 5,4 | 6,0 | 5,3 | 5,6 | 5,1 | 6,3 | 5,4 | 6,4 | 5,6 | 5,9 | 4,8 | 6,6 | 5,2 | 6,1 | 5,1 | 5,9 |
| **SU's (mean)** | 5,4 | 5,2 | 6,1 | 5,1 | 5,3 | 5,7 | 5,3 | 5,8 | 5,6 | 6,3 | 6,1 | 5,5 | 5,9 | 5,5 | 5,7 | 5,7 | 6,0 |

Our results indicate a high level of agreement between the importance of skills ranked by the group experts (required skills) and the self-reported level by the super-users (achieved skills) in facilities post system implementation, and thus support the positive impact of the selection and training process on super-user development. Table 4 shows the raw results of our survey for both experts and super-users, while Figure 2 allows for a graphical comparison across the two groups.

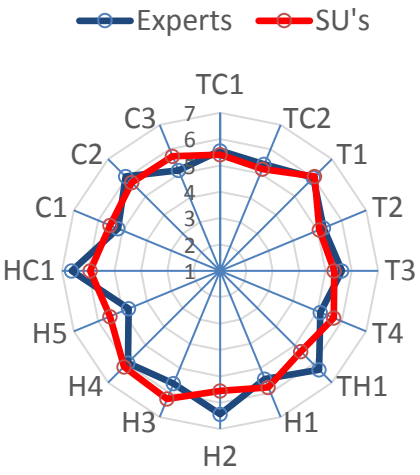


Figure 2: Mean survey results for experts and super-users

## 6. Conclusion, limitations, and future research

In this study, we investigated the role of the super user in ERP implementation projects, and built on the analysis of a large-scale ERP project to present a structured model for the development of skilled super users. Little research has so far investigated the role and impact of super users in IS projects, yet it is of high interest to the practitioner community. Previous literature has investigated which skills are required by super-users, but this study is – to the best of our knowledge – the first attempt to propose general guidelines as to how organizations can use a structured approach for this promising concept. Both qualitative and quantitative insights from the OneERP project conducted at the large manufacturing company ManuComp provide evidence for the validity of the described process of selection and training.

Despite our efforts, we acknowledge that our research has numerous limitations. Our findings are based on a single case study, which prohibits statistical generalization [24]. Furthermore, specific aspects of the case, such as the culture, language, or industry may limit analytical generalization [3]. In addition, in testing the validity of the skill development approach, we rely on self-reported data from managers and super-users, which may have resulted in biased data [14].

While practitioners' interest seems to be growing, only a few scholars have analyzed the super-user concept from an academic perspective. To close the link between super user skills and implementation success, especially a comparative longitudinal study would benefit the literature, analyzing both expectations and performance during and after the implementation. In addition, recent research suggests that using Leader Member Exchange theory could help to understand how management influences the adoption of IT [21]. The Leader Member Exchange theory highlights the quality of a dyadic relationship for the adoption of IT, which may offer an explanation as to why the super-user concept is often used by practitioners.

**References**

1. Avison, D., Fitzgerald, G.: Methodologies for Developing Information Systems : A Historical Perspective. Past Futur. Inf. Syst. 1976–2006 Beyond. 1–12 (2006)
2. Barnard, C.I.: Functions of the Executive. Cambridge, Harvard Univ. Press. (1948)

3. Benbasat, I., Goldstein, D.K., Mead, M.: The Case Research Strategy in Studies of Information Systems. MIS Q. 11 369–386 (1987)
4. Eriksson, P., Kovalainen, A.: Qualitative Methods in Business Research. Narrative. 227–243 (2008)
5. Grant, R.M.: Prospering in Dynamically-competitive Environments: Organizational Capability as Knowledge Integration. Organ. Sci. 7 (4), 13 (1996)
6. Haines, M.N., Goodhue, D.L.: Implementation Partner Involvement and Knowledge Transfer in the Context of ERP Implementations. Int. J. Hum. Comput. Interact. 16 (1), 23–38 (2003)
7. Katz, R.L.: Skills of an Effective Administrator. Harv. Bus. Rev. 33 (1), 33–42 (1955)
8. Ko, D., Kirsch, L., King, W.: Antecedents of knowledge transfer from consultants to clients in enterprise system implementations. MIS Q. (2005)
9. Kogut, B., Zander, U.: Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology. Organ. Sci. 3 (3), 383–397 (1992)
10. Mahdavian, M., Mostajeran, F.: Studying key users' skills of ERP system through a comprehensive skill measurement model. Int. J. Adv. Manuf. Technol. 69 (9–12), 1981–1999 (2013)
11. Mahdavian, M., Wingreen, S.C., Zealand, N.E.W.: THE INFLUENCE OF KEY USERS â€™ SKILLS ON ERP SUCCESS. J. Inf. Technol. Manag. XXVII (2), 48–64 (2016)
12. Markus, M.L., Tanis, C.: The Enterprise System Experience — From Adoption to Success. Fram. Domains IT Manag. Proj. Futur. Through Past. 173–207 (2000)
13. Matusik, S.F., Heeley, M.B.: Absorptive Capacity in the software industry: Identifying dimensions that affect knowledge and knowledge creation activities. J. Manage. 31 (4), 549–572 (2005)
14. Moore, D.A., Healy, P.J.: The Trouble With Overconfidence. Psychol. Rev. 115 (2), 502–517 (2008)
15. Maas, J.-B., van Fenema, P.C., Soeters, J.: ERP as an organizational innovation: key users and cross-boundary knowledge management. J. Knowl. Manag. 20 (3), 557–577 (2016)
16. Neuman, W.L.: Social Research Methods: Qualitative and Quantitative Approaches. Pearson Higher Education (2014)
17. Pan, M.Z.: AN EXPLORATORY STUDY OF THE ROLE OF KEY USERS IN ERP IMPLEMENTATIONS. In: PACIS 2008 - Pacific Asia Conference on Information Systems. (2008)
18. Pan, M.Z., Mao, J.Y.: Cross Boundary Mechanisms for Knowledge Management by User Representatives in Enterprise Systems Implementation. IEEE Trans. Eng. Manag. 63 (4), 438–450 (2016)
19. Reagans, R., McEvily, B.: Network Structure and Knowledge Transfer: The Effects of Cohesion and Range. Adm. Sci. Q. 48 (2), 240–267 (2010)
20. Saunders, M., Lewis, P., Thornhill, A.: Research Methods for Business Students. (2009)
21. Venkatesh, V., Bala, H.: Technology Acceptance Model 3 and a Research Agenda on Interventions. Decis. Sci. 39 (2), 273–315 (2008)
22. Wu, J., Wu, J., Wang, Y., Wang, Y., Chang-Chien, M., Chang-Chien, M., Tai, W., Tai, W.: Development of a tool for measuring key-user satisfaction in an ERP outsourcing environment. Proc. 6 th Pacific Asia Conf. Inf. Syst. 2–4 (2001)
23. Wu, J.H., Wang, Y.M.: Measuring ERP success: The key-users' viewpoint of the ERP to produce a viable IS in the organization. Comput. Human Behav. 23 (3), 1582–1596 (2007)
24. Yin, R.K.: Case Study Research: Design and Methods. Sage Publications (2009)