

Success Measurement of Enterprise Social Networks

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Abstract. Especially in the knowledge intensive service industry and times of virtual teams, there is a high need to support collaboration and information exchange between employees with IT. Whereas many organizations have recognized the great potential of Enterprise Social Networks (ESN) in this context, there is still a lack of well-founded and applicable approaches to make this potential visible i.e. to measure the success of ESN. To alleviate this drawback we propose a novel approach to measure ESN success covering the dimensions usage and business value. To illustrate the practical benefit and applicability of the novel approach, we provide an extensive real-world example from the service industry. In cooperation with a large financial services provider, the approach was successfully applied and led to an improved decision support for different stakeholder groups including system administrators and executive management.

Keywords: Success Measurement, Enterprise Social Networks, Social Software

1 Introduction

The dissemination of IS in form of Enterprise Social Networks (ESN) is no longer a well-kept secret in the field of entrepreneurial activities as it demonstrates positive benefits for companies [1], [27], [32],[33]. This particularly holds true for the service industry, which is characterized by knowledge intensive processes and the awareness of the high value of employee expertise [18]. As more and more employees are willing and wanting to use ESN, e.g. to exchange and share ideas with their teams, there is an increasing demand to understand how the use and success of these technologies can be measured. This is all the more important since there are various interests of several stakeholders concerned: First, due to limited IT budgets, decision makers have to justify their investments and thus have to make transparent the impact of new IT investments. Second, a system stakeholder wants to improve (the usage of) the social software. Third, the added value of the ESN to perform tasks should be shown to the users. While many investors are only satisfied with reliable numbers (“how much do I save by using the platform?”), system stakeholders and users are more interested in how the platform is used or can be improved. According to the different perspectives, there are different metrics of relevance when measuring the success of ESN.

Although impact measurement is top of mind for many companies, most of them struggle with measuring the success of social software. According to a recent study, less than one fifth of German companies measure the business impact of their social media activities [14]. To this date, also only a few scientific studies have analyzed single aspects of ESN success measurement. At the same time, most of the seminal work in the field of IS illustrates success models that highlight success for organizations or users by using a micro perspective. In these models (e.g. [25], [26]) success is defined and measured either by formative models or causal assumptions that are looking at static theoretical constructs without looking at the context and the relationships of real working practices and processes [30]. Using the case of ESN users need to make sense of how to incorporate these platforms in their day-to-day work according to their needs and individual use cases [24]. Thus, our research objective is to conceptually develop a use case-based success measurement approach for ESN and to exemplarily show its applicability in practice. Our approach helps companies in their strive to measure the success of these technologies and allows them to set objectives, to provide a control mechanism, and to measure the achievements.

The remainder of this paper is structured as follows: In Section 2, we present current success measurement models and demonstrate the lack of applicable approaches when it comes to success measurement. Afterwards, we propose a novel approach to measure ESN success (Section 3) and provide an initial set of success measures to operationalize the approach. Section 4 illustrates the applicability of the novel approach by using the case of a financial services provider. Finally, we critically discuss limitations of our work, provide directions for further research, and summarize the results.

2 Success Measurement

2.1 Success Measurement in IS

The field of IS success measurement has fostered many theories and models. In the following, focusing on very prominent examples, it will be highlighted that these approaches have something in common: they rigorously focus on success constructs, but neglect concrete use cases and easy to apply success measures.

The arguably most prominent study towards explaining IS success is the technology acceptance model (TAM) which concentrates on users and examines the reasons for IS use [5]. TAM assumes that use is based on usage intention produced by ease of use and usefulness. In the same vein as TAM, the unified theory of acceptance and use of technology (UTAUT) supposes four behavioral intentions (performance expectancy, effort expectancy, social influence, and facilitating conditions) to be reasonable for usage intention, which is determined by demographics (age and gender), experience, and voluntariness of use [30]. Apart from the fact that these and further studies imply that the acceptance about a given artifact can be evaluated in terms of yes-no decision-making and take an overly rationalist and deterministic stance, which tends

to decontextualize individual adoption [12], we argue that acceptance is not equivalent to success, but rather a necessary precondition to success.

Not much less known, but based on a larger and multidimensional set of measures and methods is the IS success model by DeLone and McLean [6]. In that model, a success taxonomy is created from technical to social and organizational success factors, which have temporal and causal interdependencies. Although the model appears to have some weak points (e.g. [11]), it is one of the most referenced papers in IS history. About ten years later the authors published an updated IS success model that includes service quality as a construct and addressed the criticism that an information system can affect levels other than individual and organizational (e.g. [16]) by replacing the constructs individual impact and organizational impact with net benefits, thereby accounting for benefits at multiple levels of analysis [7]. Further known IS success models stem from Seddon, Gable et al. and Grover et al. Comparably to the model of DeLone and McLean the model of Seddon measures latent constructs based on a set of perceptions that give a short description of the context of practice [25]. The model of Gable et al. does not consider the dimensions use and user satisfaction that DeLone and McLean applied, since they can be seen as consequence of the IS impact [9]. The model of Grover et al. examines the effectiveness of IS as a general goal of IS using a framework of effectiveness that grounds on a construct space [10].

In line with the above and as a good conclusion, the results of a multidimensional meta-analysis give a current state of the art of scientific developments concerning IS success measurement (cf. [29]). The authors note that the predominant IS success approach is based on questionnaires and structural equation modeling that focus on abstract constructs which demonstrate a typical lack of these scientific models: based on these constructs and only supported by data from questionnaires these IS success models are not easily applicable in practice. This is confirmed by several practical surveys (e.g. [2], [17]).

2.2 Success Measurement of Enterprise Social Networks

The following section gives a short literature review on some of the latest findings within the field of ESN success measurement. Similar to IS success in general, many studies are based on the models introduced above and only investigate single aspects or success factors, but miss a comprehensive, integrated and easy to apply approach. For example, Lehner and Haas concentrate on behavioral models to explain success factors [13]. Their approach does not investigate the output (e.g. number of inquiries) but the individual performance of users. Their idea is to concentrate on a whole organization and not only one specific goal assuming that companies should focus on the employees' knowledge, which represents the "system of knowledge management" of a company. The applicability of the model in practice, however, seems to be limited.

Muller et al. suggest measuring the impact of ESN by means of a metric called "return on contribution (ROC)" [15]. Based on a framework of rational choice the authors assume, that the use of collaboration tools is made for an appropriate and strategic manner. The core definition of ROC is the ratio of the number of people who ben-

efit from a resource (“consumers”) divided by the number of people who create or contribute to that resource (“originators”). Therefore, they define a metric that takes the creation and consumption of information as collaborative processes of employees into account. In conclusion, the ROC can be used to track the usage of ESN and to reveal employees’ usage patterns. However, the metric does not incorporate any business values.

In conclusion, existing scientific approaches deliver first insights into the success measurement of ESN and try to evaluate ESN from different perspectives. However, as already stated by others earlier there is still a missing congruence of the organization’s and user’s benefits perceivable in most models. Moreover and even more important, these models focus predominantly on single aspects and do not take into account concrete use cases and therefore lack the applicability in practice. Moreover, most of the scientific approaches do not take into account concrete business value metrics.

We do not want to omit that due to the necessity to measure ESN success there are also different practical approaches to ESN success measurement. Forrester Consulting for example released a study about the total impact of social software [8] and illustrated the impact of ESN using available data and selected financial measures (e.g. costs, benefits). The major findings are that social software leads to “incremental gross revenue from new products and products brought to market faster” and that employees benefit from the “ability to find and share information” [8]. A recent study by Mattern et al. provided similar results and showed that enterprise internal social media applications can lead to efficiency gains up to 90 percent [14]. The approach by Cooper et al. can be understood as success measurement based on the perspective of use cases [4]. This practice-oriented approach distinguishes measures of interactions on individual, group, and organizational level and combines them with a chronological background. As part of their approach they involve three categories – vitality, capability, and business value – to evaluate ESN success. However, these studies and approaches lack of a valid theoretical and scientific basis and can only be seen as indicators for the potential of ESN in practice.

3 Novel Approach for Success Measurement of Enterprise Social Networks

In this section, we introduce a novel approach for success measurement of ESN. First, we introduce the idea of use case-based success measurement. Then, we propose a new approach which is based on this idea. Finally, we illustrate exemplary use case-based measures for the success measurement of ESN to operationalize the approach.

3.1 Use Cases and Actions as Basis for Success Measurement

We aim at a success measurement approach for ESN which is applicable in practice. Against this background, we take into account collaborative structures of ESN usage ([18]) in order to create a well-founded but also applicable success measurement ap-

proach. Use cases are a popular instrument in science (e.g. [32],[33]) and practice to unveil relevant business processes associated with ESN usage. We take the collaborative use case “ask your colleague” as an example. This use case can consist of one or numerous collaborative practices (e.g. notifying colleagues of a specific problem, clarifying issues they need to know to help, etc.). In companies, collaborative use cases often serve to reveal critical points in using ESN or to make the benefits tangible. Incorporating use cases within our success measurement approach allows us to develop an applicable approach that addresses the needs of companies and that is based on concrete business processes. In doing so, all relevant processes with respect to ESN usage can be systematically included in the success measurement approach.

Each collaborative use case consists of different actions of collaboration (e.g. share, edit). An action describes what is done through the social software platform. As part of a larger research project, the usage of ESN and thereby especially the concrete actions were analyzed systematically through qualitative analysis of large datasets in more than 20 organizations [18]. As result of the analysis we received seven actions of collaboration for social software usage which can be defined as search, edit, rate, label, clarify, notify, and share. Table 1 briefly describes these actions, which are the basis for our success measurement approach.

Table 1. Description of actions of collaboration

Action	Description
<i>Search</i>	Search for specific content using different criteria
<i>Edit</i>	Modifications of content in order to create an up-to-date version of the content
<i>Rate</i>	Rate the content in terms of quality or suitability for the specific purpose
<i>Label</i>	Mark content in order to allocate it to a certain topic to increase retrievability
<i>Clarify</i>	Exchange different interpretations or opinions
<i>Notify</i>	Notify others about relevant content, which already exists
<i>Share</i>	Provide content in order to make it available to others

3.2 Success Measurement Framework

Based on the idea of collaborative use cases, in the following, we combine concrete actions with the perspective of different dimensions. The reasons to measure ESN success can be very different as within an organization different stakeholder groups will have specific objectives [9]. As discussed above, the executive management for example might focus on the justification of corporate investments in social software, a system admin might want to improve the usage of the social software and a user might be interested in the status quo of the platform. Therefore, depending on their specific objectives, stakeholders will be interested in different information that measures the activities and the value generated by the ESN [4]. Accordingly it is nec-

essary to measure different dimensions of success. Based up on this motivation the measures of our framework are structured according to the following two dimensions:

1. The dimension usage describes the extent of use of the ESN and demonstrates the activity of users on the platform at a very concrete level. Different scientific as well as practical-driven articles emphasize the meaning of this measurement dimension (e.g. [28]). Typical questions are: how intensive are employees using the social software? How is the usage over time? What are the most intensively used functions? Examples of action-based measures are the number of shared messages or the number of searches. Stocker et al., for example, measure the reading and writing behavior in wikis, e.g. how often users edit or comment an article [287]. These consumption-based measures provide a good look at the adoption of the technology on a rather short-term focus [4]. Generally, it is possible to collect these measures by system-based statistics.
2. The second dimension compasses the business value of social software use. This dimension illustrates organizational impact of corporate social software usage at a rather long-term perspective. A typical question in that context is: What are business goals that are supported by social software? For example, a cross-sectional analysis of several companies shows that companies have quite similar expectations on the benefits of social software: efficient, goal-oriented employee communication and avoidance of information overload, efficient knowledge transfer, the establishment of networks of experts, participation of employees and creation of open corporate culture, increased awareness, and transparency [20]. However, it is still unclear how to measure the achievement of these goals. Thus, the aim of measuring the business value is to capture the added value of the ESN for the company through a business case consideration or in form of an actual return on investment calculation. Examples for measures would be the analysis whether second level support can handle more inquiries or resolve employee calls more quickly or the case showing that the number of innovations out of the platform has brought a new product to market in less time [4].

As far as the usage measures are concerned, most of them can be allocated to the seven actions of collaboration described in the previous section. However, not all of them can be reasonably assigned to a single action. Thus, in our approach we separate the measures on the one hand into action-based measures (e.g. number of searches) and on the other hand into action across measures (e.g. total number of users). In doing so, it is possible to create context by measuring within collaborative use cases through action focus and consider further measures. The framework of success measurement in the course of collaborative use cases is illustrated in Figure 1.

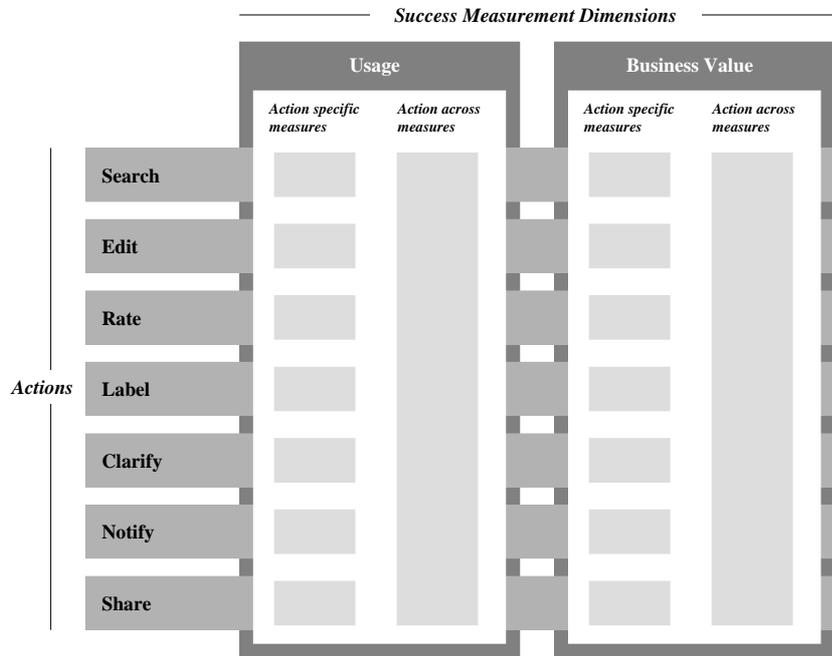


Fig. 1. Framework for ESN Success Measurement

3.3 Exemplary Measures

In order to operationalize the framework for use case-based success measurement of ESN, we propose an initial set of exemplary measures to build a solid measurement fundament (see Table 2). To assure the consistence of the success measures, they are based on the seven actions of collaboration and the two dimensions of success measurement explained above. Several of these measures have proven useful in different business projects conducted. In practice it is generally useful to integrate all relevant stakeholders at an early stage and to take them into account when it comes to the creation and selection of success measures.

There are different methods to collect the data needed to calculate these measures: To measure the usage we can access to the enormous amount of data created in an ESN. By using logfile analysis it is possible to track a multiplicity of these measures and we can only give a few examples in the following table. It is also possible to study the usage of the ESN by qualitative analysis of selected content by coding the messages exchanged according to the communication practices enacted (cf. e.g. 20]). This interpretative approach can be accompanied by user interviews and the observation of the usage on the platform. The collection of best practices, collaboratively done by the users and staff responsible for the platform can also help to spot new uses. This is important since many practices develop over time.

To measure the business value there exist several qualitative (e.g. user interviews, interviews with support or management, content analysis as a basis for process analysis) and quantitative methods (e.g. user surveys, Social Network Analysis) as well.

Table 2. Exemplary measures

Success measures	Measurement approach
<i>Usage (action specific)</i>	
[Search] Number of questions asked	Logfile analysis
[Edit] Number of document updates	Logfile analysis
[Rate] Number of useful or correct answers	Logfile analysis
[Label] Number of tags created	Logfile analysis
[Clarify] Number of answered questions	Logfile analysis
[Notify] Number of status updates	Logfile analysis
[Share] Percentage of users that publish information	Logfile analysis
<i>Usage (action across)</i>	
Total number of users	Logfile analysis
Percentage of active users	Logfile analysis
Degree of connectivity	Social Network Analysis
Number of content created	Logfile analysis
Number of page views	Logfile analysis
Average time per user and visit	Logfile analysis
Total number of groups	Logfile analysis
Percentages of different use practices	Content analysis
<i>Business value (action specific; compared to status quo)</i>	
[Search] Reduced time to find correct information	Process analysis, User interviews
[Edit] Reduced time worked with documents	Process analysis, User interviews
[Rate] Increased quality of published content	Process analysis, User interviews
[Label] Reduced time spent to organize content	Process analysis, User interviews
[Clarify] Reduced number of inquiries at 2nd level support	Interviews with support
[Notify] Increased degree of awareness of employees	User interviews
[Share] Reduced amount of emails	Logfile analysis, User interviews
<i>Business value (action across; compared to status quo)</i>	
Number of ideas	Content analysis
Increased employee satisfaction	User survey or interviews
Reduced travel costs	User interviews
Reduced time to solve a problem	Content analysis, Process analysis
Reduced time to onboard employees working in new roles	Process analysis
Reduced time to deliver a project	Content analysis, Process analysis
Degree of retained knowledge of people leaving the firm	User survey or interviews

4 Demonstration of the Novel Approach

4.1 Case and Data Collection

In the following, we exemplarily analyze the usage of an ESN at a large financial services provider that we call UNT. UNT has approximately 150,000 employees that work in geographically dispersed teams and different divisions and have a high need of efficient collaboration. In 2011 a group of approximately ten employees in the IT department set up a company network on Yammer.com, to prepare a retreat. Finally, in the middle of 2011 30 middle managers from UNT's IT department carried out the retreat in the form of a bar camp. Participants were invited to Yammer to share opinions and report on sessions during the event. Through the invite function and user-driven word of mouth Yammer spread in an avalanche-like effect, initially through the IT department and later to other departments as well. In a short time frame of several weeks more than 1,600 people joined the company's Yammer network. Even though usage started at middle management it spread all the way to the executive management and employees were neither constrained by their managers to use the platform nor was there a formal rollout of Yammer. Soon concerns about data security evolved. As the Yammer platform and its usage data is hosted outside a company's firewall and the IT security discovered security vulnerabilities of the platform, executive management finally decided to shut down UNT's Yammer network after approximately three months. Simultaneously it was decided by the board that a new inhouse platform should be chosen and implemented. By the end of 2011 a new platform had been chosen and was piloted within a six month period. Whereas the "Yammer experience" had convinced many stakeholders within UNT of the benefits of an ESN, it was clear from the beginning that a comprehensive review of the pilot phase was necessary. The review should show how the ESN can support the working practices of UNT's employees and should measure whether the ESN has positive impact on their work performance. Thus, the project team had to justify further steps (especially with respect to the rollout) and investments by evidencing that the platform creates a positive impact. During this review different data collection and analysis methods have been used. We briefly describe them in the following:

- A quantitative analysis was used to show the development of the user count as well as their distribution across countries, departments and organizational entities. Additionally, the development of different content types was analyzed. The required data were gathered via the platform internal statistic dashboard. Access to the database directly, which would have allowed an even more in depth analysis, was not possible in this period.
- A qualitative approach was chosen to study the usage of the ESN. This was done via observation of the usage on the platform itself. As a result 520 single messages from seven groups within the platform as well as 200 general status updates have been analyzed qualitatively. Based on this a genre analysis have been performed (see e.g. [23]).

- Furthermore, 33 interviews and several workshops have been conducted to gather feedback of power users and group owners.

4.2 Applying the Approach to the Case

The data presented in Table 3 and Table 4 stem from the six months period review described above. The absolute numbers are separate for each month and not added up. They have been multiplied with a factor x since the real figures cannot be disclosed.

Table 3. Exemplarily action specific usage measures collected and used in the case

Usage (action specific) measures						
Month	1	2	3	4	5	6
Search: Number of questions asked	30	92	76	120	88	64
Edit: Number of document updates	252	502	336	732	630	804
Rate: Percentage of useful or correct answers	47%	61%	39%	55%	59%	38%
Label: Number of tags created	26	64	68	122	54	38
Clarify: Percentage of answered questions	93%	84%	82%	87%	89%	97%
Notify: Percentage of status updates	45%	33%	43%	38%	36%	36%
Share: Percentage of users who post	40%	23%	19%	19%	14%	13%

Table 4. Exemplarily action across usage measures collected and used in the case

Usage (action across) measures						
Month	1	2	3	4	5	6
Percentage of active users	74%	71%	57%	56%	50%	46%
Number of content created	500	1554	2340	3650	4836	5950
Total number of groups	58	144	176	226	266	275

Whereas the usage has already been analyzed in detail as shown above, the analysis of the business value is in progress right now. In this context it is important to note that the appropriation of such a platform takes time and that some results can only be seen after a year of use or more when the ESN has found its place in the user routines [22]. A first hint of a real productive use of the ESN and a good starting point on the way to show the business value are the results of the genre analysis of the messages (see Table 5). These results give a first indication of how the platform is used and in which areas the platform can create concrete business value. The high amount of exchange of opinions, for example, is an indicator towards the goal to open corporate culture and the high distribution of new topics/issues resulting in a better awareness and transparency. Even the fact that the users are giving visible thanks to other colleagues or praise their efforts in a certain project should not be underestimated because this indirectly supports the employee satisfaction because their efforts are appreciated.

Table 5. Communication practices as basis for measuring the business value

Communication practices (result of a qualitative analysis of the messages in the ESN)	
Exchange of opinions	31%
Agenda setting	19%
Coordination	15%
Problem solving	13%
Documentation	7%
Praise & Thanks	5%
Generating ideas	5%
Informal communication	3%
Announcement of events	2%

More precisely, based on these results it is generally possible to determine business value measures. To this date, UNT has first indicators for different business value measures (action across) (although we cannot disclose concrete figures):

- Number of ideas: In our sample 36 ideas have been discussed on the platform ($720 \cdot 5\% = 36$; see table 5). A first analysis showed that some of them will help UNT to save a considerable amount of money.
- Reduced time to solve a problem: From content analysis and interviews it can be seen that the time users have spent to find what they need has been reduced considerably. A fact that helped to speed up solving problems and delivering projects.
- Increased employee satisfaction: There has been no representative survey yet. However, the 33 conducted interviews and several workshops with another two dozen users clearly show that the satisfaction of the latter has increased considerably by using the platform. Moreover, some users reported of a “new we feeling” and of perception to get to know their colleagues better.
- Reduced amount of emails: We did not yet analyze logfiles, but many employees have reported of a reduction of emails up to 20%, too.

Probably even more important is the potential of the platform to increase the knowledge transfer by making expertise in the company visible. This can have several implications, from reduced time to deliver a project to time to bring an innovation to market. We have collected many of these cases and will illustrate a quite simple one in the following. A user x shares his knowledge on a new service via posting the message: “Who needs short URLs, since Sharepoint-URLs blast every layout: SECURE URL Shortener. It’s like TinyURL in a Corporate Style. :-)” Several other users say “thank you”, one user mentions this will save time for his project, until another user states “Cool Idea! But there is room for improvement . . . How about an additional file://. . .to shorten links to a network folder!?” User x reacts to this question by saying that this might also be possible. Then other users join the conversation and think about how they could use the service, too. All the comments in this conversation are rather short and took not much time, but this simple example already shows that one post can help people to save time, but also bring new ideas to life.

4.3 Discussion of the Case and its Limitations

As discussed before the presented framework constitutes an integrated approach to support different stakeholder groups in their efforts to measure the success of ESN. Of course, the exemplary figures out of the project conducted in cooperation with UNT cannot be complete, but only extracts. Before we focus on the applicability and the practical benefit of our approach in general we want to briefly discuss some concrete figures of the case example.

Looking at the *action specific usage* measures we see that the platform is indeed used to ask questions to colleagues. However, the number of questions asked is lower than expected. This is an indicator for the need of a community management that makes the potential of the platform to help with problems more clear. In some context, the percentage of answered questions shows that the willingness to help is very high and even growing. The percentage of useful or correct answers, however, is quite low compared to what is expected. But here it is hard to say if there are really so few useful or correct answers or if the users just do not yet use the feature “Mark a answer as useful or correct” provided by the ESN. Thus, the users should be notified of this feature. The increasing number of document updates on the platform illustrates the need of direct collaboration without the problems (versioning etc.) when working on the same document via email. Compared to the number of content created the number of tags created is quite low. This shows that tagging is not yet a common thing for most users. The platform managers have to decide whether they want users to tag more. With an average of about 40% with respect to the total content status updates are heavily used. Here, the need for a lightweight work-related exchange becomes very obvious.

Looking at the *action across usage* we realize that the total number of users and the number of content created (note that here the numbers for each month are not added up) are increasing in similar proportions. As a consequence, we assume that among the new users there are always people contributing and not only checking out everything (lurkers). Moreover, the number of groups is increasing with reduced speed which is not surprising since some users will rather join existing general groups and do not have to create new ones. Furthermore, the figures show that the users are highly active, although it is obvious that there was more excitement in the early phase. At the end of the six month the activity is leveling down to a value of 46% which is still very high compared to the 90-9-1 rule of thumb that is common for social media usage (90% of the users are passive, 9% modify existing content, and 1% create new content [14]).

Looking at the *business value* we can deduce that the investment to implement the ESN seems to have already paid off partly within a short time frame. Employees were able to save time and experienced a reduced amount of emails. We also observed a number of newly generated ideas and that the employee satisfaction rose. We are sure that we will be able to measure further metrics in the near future.

Whereas it is the aim of the framework to assure the consistence of the success measures, the example above shows that the framework is applicable and can be operationalized. However, there are also limitations of our present work, which leave

room for future research. As already stated, our approach may represent a first step towards measuring ESN success. Notwithstanding, additional research is needed to underpin our results and develop the approach further. This especially holds true for the initial set of exemplary measures provided to refine and operationalize the framework. Here, the challenge of defining and evaluating concrete measures particularly with respect to the dimension business value has not been completely resolved yet. Furthermore, to precise or extend the usage success measurement dimension the concept of sociability [3] which refers to the tendency to associate with or from social groups could be taken into consideration.

5 Summary

In science as well as in practice ESN are widely discussed as a promising means to improve collaboration and information exchange between employees [1]. This especially holds true for the knowledge intensive service industry [18]. However, most companies still struggle with measuring ESN success [14]. A major reason for this fact seems to be the lack of well-founded and applicable approaches to measure the ESN success. To alleviate this drawback we developed and demonstrated a novel use case-based approach, which may represent a first step towards measuring ESN success. Our framework covers seven important actions for collaboration (search, edit, rate, label, clarify, notify, and share) and the two dimensions usage and business value. In order to operationalize the framework, we provide an initial set of exemplary measures, which have proven useful in different projects conducted. The practical benefit of our approach and its applicability was demonstrated by a real-world example from the service industry. In cooperation with a financial services provider, the approach was successfully applied and led to an improved decision support for different stakeholder groups including system administrators and executive management.

However, there are also limitations of our work, which leave room for future research. Indeed, we refer to a single case which seems to be appropriate to illustrate the practical benefit and the applicability of our approach. However, further research is necessary to show that our approach is not limited to this specific company but can be applied in further companies as well. In fact, major parts of the framework are already used in further projects in cooperation with financial services providers, IT services providers, consulting companies, and automobile manufacturers. In these projects there are still many questions open. For example, it would be interesting to use the measurement framework to differentiate between cases where the introduction of ESN succeeded and cases where the introduction of ESN failed. We hope that our work will open doors for further research activities in this exciting area.

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