

INNOVATION ASSESSMENT VIA ENTERPRISE INFORMATION MARKETS

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Abstract: The assessment and evaluation of ideas and innovations has always been a challenging task in innovation management. Depending on the business culture, innovation proposals can be reviewed and assessed by employees in order to get valuable information before the innovation implementation. Employees often have direct contact to customers and consumers which is of highest importance in innovation management. In this paper, we present Enterprise Information Markets (EIM) as a tool for innovation evaluation. In a field experiment at EnBW, one of the biggest electricity suppliers in Germany, we adopted an Information Market web tool to assess innovation proposals submitted by employees during an innovation workshop in order to test the success of EIM in an enterprise context. We analyze the motivation of employees as well as their expectations for a set of innovations compared to the expectations of decision makers. The results show that EIM are accepted by employees and that markets are a valuable tool for the innovation assessment in enterprises.

1 INTRODUCTION

Companies have been pursuing innovation management for years. Managing ideas with structured processes should guaranty that valuable ideas won't get lost and innovation processes can be conducted with success. For example, employees often have good ideas to improve processes or organizational structures. Instead of disregarding these ideas, the ability to innovate is a key success factor for growth and competitiveness (Christensen and Raynor, 2003). Following (Corsten et al., 2006), an innovation consists of 3 major steps: First of all, somebody has to have an idea (1). If the idea is promising, it will be worked out to a functioning prototype or a proof of concept: the invention (2). Last but not least, it must be rolled out in the market to complete the properties of an innovation: the diffusion (3). In the following, we focus on the assessment of ideas in order to pick the most promising one out of a pool of ideas engaging employees via Enterprise Information Markets

(EIM).

The evaluation of new ideas and identification of future trends is a challenging task since it is often based on vague information and uncertainty due to long time horizons. In order to complete this task successfully companies often follow the iterative Delphi process of distributing questionnaires and collecting experts opinions. Information Markets (IM) on the other hand rely on the fact that stock prices carry and aggregate diverse information in a single attribute price. (Green et al., 2007) compared both methods to elicit forecasts from groups. Compared to the Delphi method, IMs bear the advantage that the results (i.e. valuations of participants) can be interpreted continuously, that new information can be integrated immediately, and that trading itself is often intuitively understood by the participants. Furthermore, IMs are often considered as a method to support "Wisdom of Crowds" because they aggregate information held by many people and have a participative element (Surowiecki, 2005). On the other hand, trading in IMs

gets cumbersome for large studies with many questions and low liquidity for very small sample groups. The use of IMs in the context of innovation processes and forecasting appears advantageous since the participants do not have to exhibit their complete knowledge. Thus, participants use their information to gain profits from stock trading and report their opinion indirectly. Additionally, IMs have also a playful aspect.

Soukhoroukova and Spann successfully used IMs for the assessment product innovation alternatives, e.g. mp3 players (Soukhoroukova and Spann, 2005). Compared to conjoint analysis and other methods, IMs with 8-12 participants are more robust and reliable compared to conjoint analysis with 307 participants. Spann emphasizes that IMs must have an appropriate amount of traders to work well (Spann and Skiera, 2004). But people do not want to trade if markets are thin. One way to add liquidity is the introduction of Market Makers. In financial stock markets like NYSE or NASDAQ Market Makers are common in order to provide liquidity. Stathel et al. analyzed the impact of automated market making in virtual IMs (Stathel et al., 2009). In a field experiment for the European Soccer Championship in 2008, the results show a significant gain in liquidity through the usage of automated market making.

IMs bear several advantages compared to other methods for information aggregation like surveys or nominal group techniques. As traders reveal their expectations via buying and selling shares representing a future event, the trading success can be bound to a performance based incentive system. The better a participant trades in the market, the more he gets compensated either with prizes or real money. Hence, this powerful incentive mechanism motivates people to stay active in the Information Market. Furthermore, people in IMs are a subject to the so-called “self selection” process. Only people having superior information are supposed to join the Information Market and to make profit by contributing their information. Another advantage is the continuous trading possibility. As online Information Markets are fully automated they operate 24 hours a day, 7 days a week. Therefore, once a participant likes to reveal his information, he can use the market at any time. A survey or Delphi study represents only a snapshot in time compared to an Information Market. Furthermore, IMs tackle several challenges regarding common resistance against business change. In general, every innovation can be considered as a change project. Therefore, we discuss challenges of change projects in the following section.

In change projects, several challenges exist in enterprises and the business culture that may steer innovation projects into trouble. (Jørgensen et al.,

2008) conducted a comprehensive survey among 1.500 practitioners worldwide in order to investigate the reasons of project failures¹.

Figure 1 shows the results of the survey regarding the project success rate in companies that project leaders reported. Therefore, 59 % were somehow troubled, whereas 15 % out of these missed their goals or were stopped.

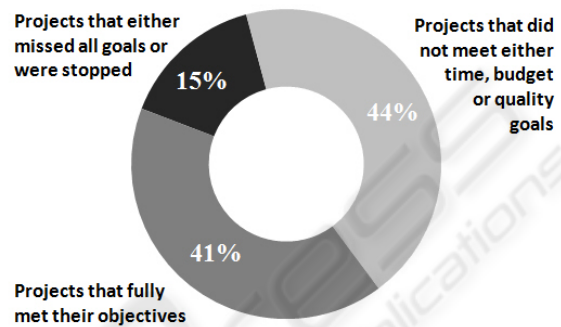


Figure 1: Success Rate in Change Projects.

This indicates that approximately 60 % of all change projects can be improved in order to reduce the fraction of troubled projects.

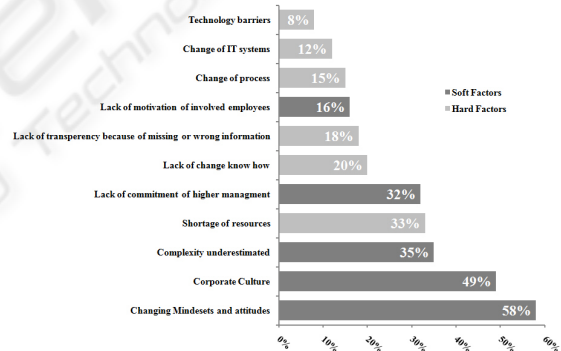


Figure 2: Success Rate in Change Projects.

In figure 2, the three major significant challenges are the “changing mindset and attitudes” followed by the “cooperate culture” and the “complexity of projects”. One cannot rank all these challenges according to their importance based on the numbers in figure 2 which represent the frequency how often the aspect was mentioned in the survey without relating them to importance. There are three aspects mentioned in the survey which we like to address with

¹The survey covered 1.532 organizations of all sizes, balanced around the globe and across industries. In total, 21 industries, whereby 14 % companies employed more than 100.000 employees and 22 % had less than 1.000 employees.

an EIM:

- Lack of higher management commitment (32 %)
- Lack of transparency because of missing or wrong information (18 %)
- Lack of motivation of involved employees (16 %)

In the following, we introduce the concept of EIMs as a tool for innovation management which we applied during an innovation cycle at EnBW². The EnBW is one of the biggest electricity suppliers in Germany and conducts internal innovation workshops since 3 years. Employees were invited to develop ideas and describe them in innovation project proposals in order to improve their working environment. The two day workshop's scope was exclusively about IT-Services improving employees' working environment. Having the workshop proposals consolidated, the remaining innovation project proposals were traded for several weeks in an EIM by employees involved in the innovation workshop.

This paper is structured as follows, in the next section, the EnBW Innovation Market will be introduced, followed by an in depth description of the market design and arrangements. In section 3, the field experiment results are illustrated and related to the challenges in innovation processes. The paper ends with a conclusion summarizing the contribution of this work.

2 THE ENBW INNOVATION MARKET

In the following section, we present the results of the EIM at EnBW. We introduce the EIM design before we state research questions in order to illustrate the results accordingly.

2.1 Experiment Design

The innovation workshop in March 2009 was held the 3rd time and the experience of the executives in doing workshops for innovation topics is, that employees are in general interested in contributing their knowledge. The objective of the workshop is to have a mixture of presentations about new technologies concerning internal processes in order to activate the attendants' creativity of how they could use new technologies to make their own daily work more efficient.

On the 1st workshop day, attendees had been given a comprehensive overview about interesting recent technological developments. These technologies

²<http://www.enbw.com>

Table 1: Products in the EIM.

	Name
01.	Twitterinfo
02.	MEREGIO-Plattform
03.	Heim-Automation
04.	Parallele Dokumentenbearbeitung
05.	Intelligente Terminplanung
06.	Web 2.0 Plakate
07.	Digitalisieren von Visitenkarten
08.	xing@enbw.com
09.	new contact networking
10.	All in One
11.	Geräteinventar
12.	mobile Zählererfassung

(ranging from interactive social technologies to devices for power management) were identified by company representatives previous to the workshop. An initial collection of technologies was gathered by an agency and the 12 most interesting ones for the company were selected to be presented in the workshop presentation slots.

On the 2nd day, attendees had the opportunity to discuss their ideas in groups in order to develop and improve them further. After every 30 minutes, groups were mixed up so that everybody could talk with as many different persons as possible. That guaranteed the maximum of feedback to ones' ideas. Finally, attendees had the chance to submit their innovation ideas. Altogether, 80 innovation proposals were submitted.

During the two days workshop the company noticed that attendants were very interested in further developing their ideas and therefore they supported discussions with a company internal Wiki software. Thus, attendees had the possibility to review and discuss their innovations. After 4 weeks of improvement and discussion, 12 ideas were consolidated and ready to be assessed via an EIM. In our experiment setting we use one EIM for employees and one parallel EIM limited to experts. Additionally we set up an expert panel including decision makers. Table 1 gives an overview of the 12 selected innovation alternatives.

The observation of the workshops in recent years was that participants were very cooperative and interested during the workshop, but there was no adequate method and process to keep them in the innovation context after the workshop. As innovation workshop participants were encouraged to join the EIM, it should deliver evidence that employees can be actively engaged in the innovation process.

The EIM was available online from 2009/05/04 till 2009/06/12. Furthermore, compared to a regu-

lar financial exchange, the market was available 24 hours, 7 days a week. All in all, 110 people joined the innovation workshop and everybody received an anonymous account as well as a password to join the EIM. The participants were supposed to trade virtual stocks representing innovation alternatives (Table 1) in order to rank them according to their personal expectation about the overall benefit for the company via buying and selling shares. Each account was initially endowed with 100 shares of each stock and 100.000 virtual currency units. Therefore, participants were able to conveniently trade immediately in each stock and did not have to buy an initial depot by themselves. Additionally, an automated market maker was constantly offering trading possibilities in the EIM to ensure liquidity. The market maker mechanism was slightly adapted from the one Stathel et al. used in their field experiment (Stathel et al., 2009).

The strategy of selling and buying shares depends on the participant's individual expectation of the attractiveness of the underlying innovation. If they thought that an innovation is *overvalued* compared to another innovation alternative, which is in their mind of minor attractiveness, they were supposed to sell shares. Vice versa, if an innovation alternative is *undervalued* in their opinion, they should have bought it in order to raise the market price so that it represents their expectations.

After the market was closed on the 2009/06/12, it was expected that the stock prices represent the aggregated valuation of all participants (Fama, 1970; Fama, 1991). Participants gave their private information in the market via buying/selling orders while the market mechanism aggregated all these. Once the market was closed the innovations were ordered by their market price and this ranking could be interpreted. As a benchmark, opinions from decision makers and an identical, parallel EIM for experts were taken in order to evaluate if these expectations are congruent with the EIM for employees. From decision makers, a ranking was collected without having them traded in a market to compare it against the market results. Figure 3 summarizes the EIM experiment design.

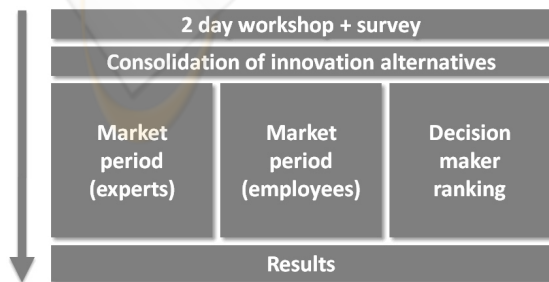


Figure 3: Field Experiment Timeline.

2.2 User Interface

Figure 4 shows the start screen of the EIM. On the left hand side, the navigation sidebar enables easy access to the basic functionalities. It was visible at all times. The content area (in the middle) shows a text explaining the market goals. Traders, accessing the market for the first time, were informed about the motivation of the EnBW, why they run the EIM and what they expect from traders. Furthermore, it states that the two best performing traders will be rewarded with prizes.



Figure 4: EIM Start Screen.

The content area changes depending on what traders want to see. On the trading screen, traders could submit their orders. They could also access their depot screen or their transaction screen and so on.

2.3 Research Questions

The main research question we like to investigate within this work is:

How can we design Information Markets to assess innovations in companies?

In order to get indications for that question, two major objectives motivated the field experiment. The first goal was to motivate participants using the market system and to actively reveal their personal (changing) expectations for a certain time period. Traditionally, these expectations are being collected via a questionnaire or expert groups. As these structured approaches are restrictive, the results are only valid at one point in time. To get another evaluation the questionnaire has to be repeated or the expert

group has to meet again because expectations and beliefs change over time. By introducing an EIM, employees are able to reveal their expectations continuously over a certain period.

On the other hand, motivating people to take part in an IM is very important and only the first step towards a successful method. It is equally fundamental to harness the implicit knowledge of participants via an appropriate IM design and incentive mechanism. The aggregation of information in markets can only work well, if implicit information can be extracted and interpreted from traders. Results of both aspects are analyzed in detail in section 3.

The main research question is therefore subdivided into several research questions focusing on the two aspects mentioned above. The following list shows the subdivided research questions:

1. Are employees motivated using EIMs?
 - (a) How is the trading activity spread over time?
 - (b) How many traders are active during market duration?
 - (c) How often do traders use the Innovation Market?
 - (d) Will the Innovation Market be accepted by employees?
 - (e) How motivated are employees using Information Markets?
2. How can implicit knowledge be harnessed?
 - (a) How do employees assess the method of Information Markets?
 - (b) Do employees think that the EnBW is able to assess innovations better with Information Markets?
 - (c) Do the results of the Information Markets and the expert panel differ in innovation contexts?

Research question one and the relevant subdivided questions are intended to indicate how traders are motivated during the market period. In innovation contexts, innovation cycles may last several months or years. During that time, new information about the innovation’s feasibility is very likely to occur. For example, a technological breakthrough or unexpected resources may make an innovation viable. In long lasting Innovation Markets, new technological developments may be a motive for traders to change their expectation about the innovations in the market. In the end, their changed opinions are observable by different depot structures. The second research question is also subdivided in several research questions. These questions are intended to get an indication, how employees estimate the overall benefit of an EIM.

3 EXPERIMENT RESULTS

As stated in section 2.3, the two main research questions are divided into two aspects “Motivating Employees” and “Harnessing implicit Information”. In the following two subsections, the main results of both aspects are discussed in detail.

3.1 Motivating Employees

In the following, the motivation of employees using an EIM will be evaluated via two empirical aspects. Firstly, the market activity of employees is analyzed via their trading activity in the EIM (research questions 1 a-c). Secondly, survey results deliver evidence for the assessment by employees and their motivation in using the EIM (1 d-e).

3.1.1 Market Activity

Figure 5 shows the stock price changes for each stock over time. The stock prices for several products vary heavily, which is an indication that trading activity was intensive during the market period. Some stocks were only sparsely traded and were therefore of minor attractiveness for traders.

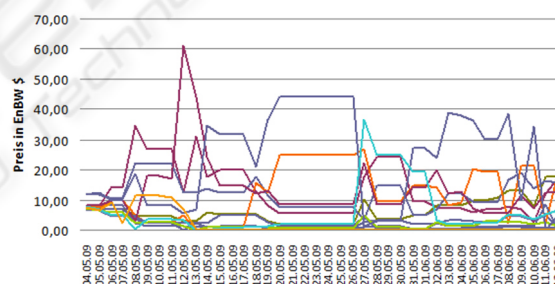


Figure 5: EIM Stock Prices over Time.

In order to further analyze the trading activity, figure 6 exhibits the trading activity on a daily average basis of all transactions, where human traders were involved. As stated in section 2.1, an automated market maker mechanism was actively trading in the market continuously providing traders with trading opportunities. Hence, the market maker only reacts if a human trader submitted a matching BUY or SELL order. Thus, the following figures focus on transactions in which at least one human trader was involved, because the market maker could have traded with itself to avoid several price effects. For further details, refer to (Stathel et al., 2009).

One can see that between 05/20-05/25 no transactions occurred. During that timespan, there was a nationwide holiday and many employees took days

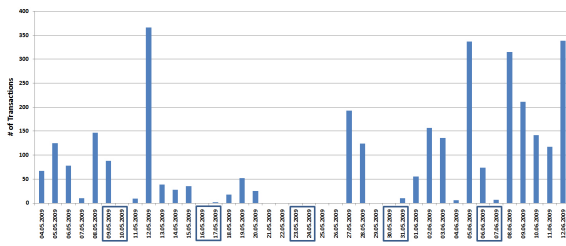


Figure 6: EIM Trading Activity over Time.

off. Besides this, overall trading activity was observable, more or less every day. In total, trading occurred on 30 out of 40 trading days including weekends. Some traders remembered their user name and their password and logged in during weekends, which was not expected. In figure 6, the weekends are marked with blue boxes. The daily trading average was 110 transactions with human involvement with a minimum number of 2 and a maximum number of 366 transactions. In total, traders caused more than 2.000 transactions and submitted more than 4.000 orders.

Figure 7 shows the number of transactions per trader. In total, the most active trader triggered slightly more than 1000 transactions and the least active trader did only one transaction.

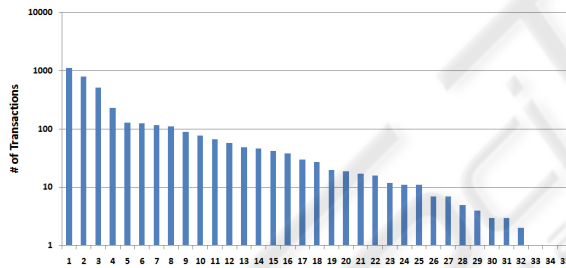


Figure 7: Transactions per Trader.

The results in figure 6 and 7 indicate that research questions 1a, 1b and 1c can be answered. Concerning 1a, the trading activity is spread over the whole market period. That is exactly what one may expect before. The expectation, that the trading activity is only observable at the beginning of the market period, can be denied.

Research question 1b can be answered with 35 traders. In total, 110 workshop participants were invited to join the market after the innovation workshop. About one third followed the invitation and traded in the market. Approximately 10 traders triggered nearly 100 transactions, whereas 10 traders performed less than 10. The rest resides somewhere between 100 and 10 transactions. That is also what one can expect ex ante and is a typical distribution of trading behavior reported in IM experiments (Luckner, 2008). Second-

arily, figures 5, 6 and 7, show that traders used the EIM nearly every day – even on weekends. On 30 out of 40 market days traders used the market, which is quite more often than what one may expect. This indicated that the motivation of traders does not decrease over time which is a very nice result regarding research question 1c.

3.1.2 Survey Results for Motivational Aspects

After the innovation workshop at EnBW, workshop participants were asked by a paper based survey about their opinion using an EIM at EnBW. The overall response rate of the 110 participants was at 69 %, which is representing. To indicate the related research questions 1d-e, we focus on two questions from the survey. One question was intended to get an estimate about how employees approve the usage of an EIM. They answered via a 5 point Likert scale where 5 represented “very good” whereas 1 represented “not good”. On average, employees answered with 3.54, a median of 4.00, a variance of 0.86 and a standard error of 0.93. This indicates that the employees *positively* judge the approach of using an EIM for innovation assessment. This results supported by the high trading activity presented in the previous section and the overall motivation of employees in using an EIM and indicates, that employees approve the usage of EIM (Research Question 1d). Furthermore, another question asked about the employees’ motivation using an EIM. Similarly, employees were expected to answer via a 5 point Likert scale where 5 represents “very high” and 1 indicates “very low”. On average, employees answered with 2.85 whereas the median was 3.00. This indicates that the motivation using an EIM for a longer time is perceived as neutral (research question 1e). Nevertheless, as results in section 3.1.1 indicate a high motivation of employees and altogether, the results show evidence for the motivation of employees in using an EIM.

3.2 Harnessing Implicit Information

A very common way to measure the accuracy of IMs is to compare its results to an observable benchmark. In case of sport or political events, results of IMs can be compared to the final values of the sport event outcome or the final values of the election (Servan-Schreiber et al., 2004; Berg et al., 2003; Luckner, 2008; Spann and Skiera, 2004; Stathel et al., 2009). In case of EIM, a similar final value may exist, if sales figures or project run times are traded. In case of using EIM without real world events such as innovation assessment, IMs are nevertheless applicable even if no final value is observable (Soukhoroukova,

2007; Chen et al., 2009). In case that no observable real world benchmark or event can be used to determine the accuracy of an EIM, other benchmarks are needed. One option introduced by (Spann and Skiera, 2004) is to run two markets in parallel. Traders are only allowed to participate in one market. If both markets are closed, the final stock values of the first market can be taken as a payout function for the second market and vice versa. Other approaches are reported by Slamka or Chen by using the final stock price as payout function (Slamka, 2009; Chen et al., 2009). It is doubtful to use the last transaction price as a benchmark because the payout function has to be transparent to traders in EIM and therefore strategic behavior is beneficial for traders. Traders may tend to steer their favored stocks as they like the market result should be and that is not what should be fostered. The payout function should lead traders to reveal their real expectations based on the goal the market should fulfill. The payout function should be the dominant guideline that strategic behavior is neither rewarded nor incentivized. Therefore, we designed the payout function that the outcomes of the EIM for employees were weighted 1/3 and the results of the EIM for experts were weighted 2/3. The market for experts were not accessible for employees and vice versa. The intention was to motivate employees to reveal their true expectation because they did not know what the results of the expert market would be. Therefore, they had no incentive to play the market and traded their true expectation in order to align to the expert market in order to make a profit.

For the field experiment at EnBW, two benchmarks were intended to be compared to the results of the EIM for employees. The first one was an identical market running in parallel. Dedicated experts chosen from EnBW and also presenters of the slots during the innovation workshop were supposed to use the expert market. These experts were employees mostly from external companies affiliated with the EnBW. In total, 8 experts were supposed to participate in the expert market. Unfortunately, only 7 transactions were observed in the market so the result cannot serve as a benchmark. The reason for this was that the experts were not originally employees of the EnBW and therefore had no interest or not sufficient information to trade in the expert market. Regrettably, the results from the expert market must be discarded.

The second benchmark was the comparison to a ranking created by decision makers for innovation processes at EnBW. In the past, the innovation workshop was conducted twice and every time the decision makers came to their decision which innovation will be implemented by themselves. In 2009, the EIM was

an additional method to get further information from employees which was a rather new situation even for decision makers. In the next section, the interaction between the EIM and decision makers will be illustrated.

3.2.1 Expert Expectations and Information Markets

After the market closed, we paid traders according to their depot structure and the weighting against the expert market. Due to the fact that the expert market collapsed, the weighting had only minor influence and did not change the ranking from the EIM for employees. Therefore, only the results for the EIM for employees can be benchmarked against the results of decision makers. All things considered, there are four imaginable outcomes of the two benchmarks which are described in table 2.

Table 2: Possible Outcomes.

		EIM	
		positive	negative
Decision Makers	positive	good (1)	action required (2)
	negative	action required (3)	good (4)

In the first case (1), market participants as well as the experts (decision makers) come to the same or similar innovation ranking. This indicates that the majority of people involved in innovation processes think the same way about the most promising innovation. In the second (2) and the third (3) case, either the experts or the market points in different directions. For the company, this is an indication that at least one group thinks differently about the innovations, but it is left unclear, who is right. But in innovation contexts, one cannot state that the one innovation is right and the other is not *ex ante*. Therefore, the indication in case one is mostly desirable, because the decision makers in the company may have a suggestion, which innovation they should support by themselves. And if both, the market and the experts, point in the same direction the decision to make is easier to assert. In the second and third case, it is of high importance, that before the final decision is made the decision makers check the innovation again, eventually through another control group like external consultants or internal counselors. The different direction of the market and the experts' opinions are a valid sign to do so. In the worst (4) case, the market as well as the experts point to the same direction, but both groups may have a different perception about the innovations compared to what is the *right* decision. If the decision makers haven't such markets, they must decide which innovation they should go for. Either way, the combination of experts

and IMs is a way to have the possibility to get more opinions from groups with different point of view – and that is what is very important in innovation contexts. In case 2 and 3 this indication may be a valuable hint to rethink an innovation. Through the self selection process, only employees with relevant knowledge are supposed and expected to join the market. One trader may have information about the customer or business partners needs and makes his decision about an innovation based on that information. Another employee maybe has another business network and therefore can input that information into the market. All in all, for the company there is no disadvantage having an additional information source which innovation the employees prefer. Moreover, they have an additional control group to experts or consultants in order to identify the most beneficial innovation.

In case that the market and the experts have the same expectation about the innovations, it may happen that the decision makers have a different one. That is expressed in the table 2 by (negative/negative). But it cannot be determined *ex ante*, in which sector in table 2 the results are, because sector 1 and 4, as well as 2 and 3 are possible, depending if the results from decision makers can be assumed as positive or negative, which is not possible *ex ante* – and not possible *ex post* too. *Ex post*, it is not feasible to check if the results of a “wrong” results turn out to be right, because not all innovations can be implemented and checked for success. Even if an innovation may be the best one and is lower ranked from the “positive”-labeled, it may be the best one. But that cannot be proved until all innovations are implemented and evaluated against each other. As already pointed out, there is no disadvantage having sophisticated information about the employees’ expectation via markets and experts additionally. Either way, it helps to avoid implementing a barely advantageous innovation – but not necessarily. Besides the effect, that employees are integrated in decision making, which has relevance for the business culture, the EnBW noticed two major benefits of having the EIM for employees in addition to expert opinions:

1. Additional ranking of innovations
2. Information from a group of employees

3.2.2 Survey Results for Harnessing Implicit Information

In table 3, the combined prices of the EIM and the EIM for experts are displayed. The combined price is the combination of the weighted EIM prices (1/3) and the EIM for experts (2/3). As described before, the EIM will be compared to the ranking by decision

makers. Unfortunately, the expert market only generated 7 transaction, which is not usable as a benchmark. As one can easily see, the results of the expert market did not change the overall ranking in the combination of the total payout prices. Therefore, the payout was realized with the weighting, although the expert market was illiquid.

Furthermore, table 3 shows the ranked results from decision makers. The horizontal line divides the top 5 stocks in the EIM because the final values were above the issued price of 8.33 currency units. Therefore, it can be assumed that these 5 innovation proposals are favored by employees. Interestingly, the top three innovations from decision makers were also under the top four innovations in the EIM which indicate that in this field experiment the result from the EIM differs only slightly from the decision makers (research question 2c). This is a strong indication that decision makers as well as employees in the EIM have the same expectation, although they were separated during the runtime of the EIM.

In this context we also asked employees after the innovation workshop with 110 participants about their assessment, if the EnBW will be able to better assess innovations via EIM than traditional methods prior to the experiment after a tutorial and introduction to EIMs. In total, 68 participants answered that question. The 5 point Likert scaled question (5 “strong agreement”, 1 “no agreement”) was answered with an average of 3.19 and a median of 3.00. The variance was 0.86 and the standard deviation was 0.93. One can see that the overall opinion of employees with an average of 3.19 is positive, that most of them believe that the approach of using EIM is beneficial for the company. The variance as well as the standard error and especially the median indicate that the results do vary slightly and the majority of the respondents consider that a company can assess innovations with EIM. This indicates that research question 2b can be answered positively. That result is not surprising, because the employees can be *integrated* in innovation processes via EIM. For employees, it is a simple participative way to make their information available to executives and decision makers anonymously. One problem in companies with strict, top down hierarchies is, that employees think they do have no impact on decisions and the executives make their decisions independent of the employees opinions. It is not feasible to ask each employee about his opinion, but with EIM, interested employees can join the market and offer their information whereas the market mechanism aggregates each individual information effectively. Moreover, that is also a benefit for decision makers and executives.

Table 3: Combined Prices and Decision Makers Ranking.

Name	Combined Price	Expert Market	EIM	Decision Makers Ranking
All in One	17,13	7,50	36,40	3
MEREGIO-Plattform	12,58	7,90	21,94	8
Web 2.0 Plakate	11,64	8,34	18,24	1
xing@enbw.com	10,92	8,34	16,07	2
Parallele Dokumentenbearbeitung	9,25	8,34	11,08	7
Geraeteinventar	7,56	8,34	6,00	11
mobile Zaehlerfassung	7,54	8,34	5,93	6
Heim-Automation	6,32	8,34	2,28	9
new contact networking	6,10	8,34	1,62	12
Intelligente Terminplanung	5,85	8,34	0,86	4
Digitalisieren von Visitenkarten	5,83	8,34	0,81	10
Twitterinfo	5,72	8,34	0,49	5

In the next survey question, the workshop participants were asked, what their opinion about the approach of using EIM to assess innovations is. The question was how they assess the method of EIM for the assessment of innovations. In total, 67 participants answered that question with an average of 3.54 and a median of 4.00. The variance is 0.86 and the standard error is 0.93. This indicates that the employees judge the approach of using EIM for innovation assessment as a good one concerning research question 2a. The 5 point Likert scale ranged from 5 “very good” till 1 “not good”. This fosters the results from the question before (2b). Both results do show a positive correlation of 0.566, which indicated that the EnBW is able to assess innovations better with EIM from an employees view. Furthermore, the correlation is significant at the 5 % level. In general, participants consider EIM as a good method for innovation assessment. Concerning research question 2b, the overall results indicate that employees are sure that EnBW is able to evaluate innovations with EIM.

4 CONCLUSIONS

This paper shows that Enterprise Information Markets motivate employees to take part in innovation processes. Furthermore the field experiment at EnBW achieved continuous participation during the market period. Market participants approved the method of EIM and used it more often than one may have expected. Moreover, the results show that the assessment of the EIM and the expert panel overlap in the top 3 innovations, which indicates that in this field experiment the results differ only slightly regarding the ranking of the innovations. The situation could have been different, if the market results differed significantly from the results of the expert panel and hit case (2) or (3) in table 2. Then, the decision makers have

to take further activities like hiring an external consultant or involve other people capable of giving an independent ranking. Another management decision could be to invite so-called *Lead Users* to an expert round and discuss their trading motives and further elaborate on the underlying information. Lead user analysis is a way to identify users in markets having superior information (Spann et al., 2009). The analysis can be based on market activity as well as market success of single a user. A lead user analysis was also conducted, which is not discussed in this paper in detail due to page limitations. After the EIM closed, the market results were verified in an expert panel which finally decided to implement two innovations in 2009. The implementation of “Web 2.0 Plakate” was finished within the second half of the year 2009. “xing@enbw.com” won one out of three so-called “Innovationsgutschein” worth 25.000€ in an internal award procedure and is going to be implemented shortly. In total, 10 innovations contenders applied for the three coupons. Therefore, the results of the market supported the results of decision makers strongly.

Figure 8 shows, which success factors are most relevant for change management (Jørgensen et al., 2008)³. The three top categories are also addressed with the market. Interestingly, the top aspect is the sponsorship by the top management. During our extensive analysis, some executives in the EIM were identified as lead users. If the top management is also involved in innovation processes as lead users, this can be interpreted as a very strong sponsorship and shows top management commitment.

The second success factor, “Employee involvement”, is also addressed with an EIM. Employees were invited to join the market, if they were interested

³<http://www-935.ibm.com/services/uk/gbs/pdf/making-change-work.pdf>, 2010/03/10

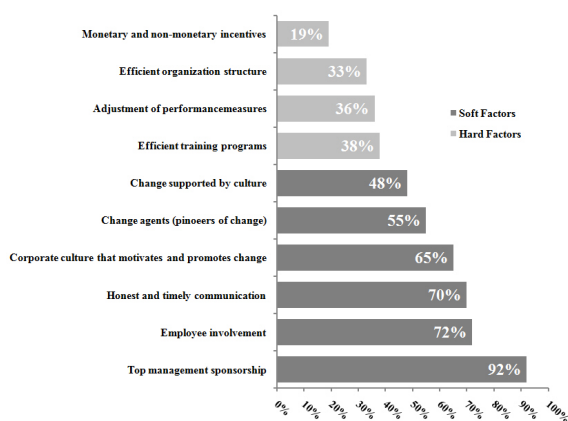


Figure 8: Success Factors of Change Management.

in making their expectations available in the market. Employees took part in the market following the self selection mechanism and if an employee did not want to join the market, he was not forced to. Furthermore, honest and timely communication is another essential success factor in change management. The market can also be considered as communication method, because employees can communicate even “negative” information via the market mechanism. Often, employees do not communicate because they fear consequences from their managers, if they announce negative information. In EIM, every employee is anonymous and may fearlessly communicate even negative information. Often, the success of change processes are directly connected to the company culture (Corsten et al., 2006). EnBW uses EIM in order to involve employees actively, which indicates a very open company culture. Often, employees cannot be involved in innovation process due to complexity aspects in managing thousands of employees via questionnaires or online surveys. Information Markets are a very scalable method to involve a large number of employees efficiently and at low costs once the market system is implemented (Spann and Skiera, 2004). The market mechanism aggregates new information continuously and people participate autonomously, hence motivating and involving employees to participate in innovation processes. All in all, for the EnBW the EIM was a new way to communicate with their employees in innovation processes and it provides a sustainable method for long involvement after the innovation workshop. Due to the success in 2009, the EnBW likes to run another EIM in 2010. The very valuable knowledge of employees is now a key main pillar in their innovation process and therefore the next EIM will be successful and confirm the results presented in this paper.

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