ERNI Experience reports on management, processes and technology

Experience

NO.61
JUNE 2014

KNOWLEDGE COMMUNITIES AS DRIVERS OF INNOVATION
Creating space for free thinking

FROM REQUIREMENT TO CUSTOMER BENEFIT
The wow factor in software engineering

AGILE OR INNOVATIVE? OR BOTH?
Everybody working from the same page

PRICING MODELS THAT ENCOURAGE INNOVATION
Transparency and agility in pricing

DEVELOP INNOVATIVE SOFTWARE — BUT HOW?

ERNI
enables & delivers

Software development is a creative process, comparable perhaps with the publication of a compendium: It requires an idea and content, work techniques, appropriate knowledge and the experts to compose the various chapters. The editor is responsible for ensuring coherence, but otherwise the individual authors should be given as much freedom as possible. But how, in the midst of predefined processes and methods, does a software development department foster more creativity that can be released on the market as innovation? Answer: by providing incentives throughout the entire development process to create a climate that promotes innovation within the company and in collaboration with partners.

The first article illustrates how companies need to be set up on an organisational and process level so that knowledge flows and can be shared across departments and processes. We introduce knowledge communities as a means of overcoming the silo mentality in companies and tapping into the potential for innovation that an interdisciplinary way of working offers.

The second text focuses on requirements management, where the seeds for innovation are sown. Here, if the team works with specialist departments to successfully translate ideas or features into clear requirements, structuring and classifying them appropriately and visualising them in an understandable way, underlying intentions become more comprehensible and ensure that stakeholders are better integrated.

Then, we explain how feedback from stakeholders and future users is qualified and fed back into the *(development)* process as quickly as possible so that the functionalities that are innovative for the customer can be developed further with the shortest possible time to market and without any loss of time or money.

EXPERIENCE is rounded off with an article that highlights how, even when it comes to pricing, customers and external development partners can exercise their responsibility to create the freedom required for innovation.

We hope you enjoy reading this issue!

Best wishes,
Christoph Aeschlimann

CHRISTOPH AESCHLIMANN:
christoph.aeschlimann@erni.ch
Business Area Manager at ERNI Switzerland

Advisory Activity: Project Management, Process and Organisational Consulting, Near / Off Shoring Projects

Read all articles online now!
We are happy to answer any of your questions by email: **info@erni.ch**

CREATING SPACE FOR FREE THINKING

Creating a culture of innovation within a company requires experience of best practices combined with the motivation to enter into unknown territory.

Every company should strive to see itself as a learning organisation and to create an environment in which both experienced employees with a lot of expertise and newcomers with fresh ideas can benefit each other. A climate for innovation can be promoted in a targeted manner if the external consultant can mobilise a diverse network of experts to solve problems from different perspectives.

BY JAZZ KANG AND
JEAN-CHRISTOPHE DUMÉRIL

Expert knowledge, specialisation and the division of labour are key components of our information society. Highly qualified workers add value, gaining critical experience as they progress and use this experience to inform their daily work so that results can be achieved faster, more effectively and more efficiently. For a company, this specialist expertise is like an invaluable treasure that must be preserved. Creating ways to gather, classify and document existing knowledge within a company is therefore an important task for management. However, unlike treasure, knowledge can only take effect if it is regularly reviewed, refreshed and — most importantly — shared. We all know that innovation does not happen in isolation, behind closed doors. Innovation requires us to leave the beaten track and open our eyes to new perspectives.

In day-to-day business, however, there is usually little time or opportunity to look at the bigger picture. An objective view from outside — be it from another department or from external third parties with professional expertise in knowledge management practices — can help break down silo mentalities and organisational blindness. After all, innovation is predominantly found where processes meet technology, and both of these elements are controlled by people. In this respect, a climate that promotes innovation will thrive when people are at the centre of it — their knowledge, their experience and their desire to work together to make a difference.

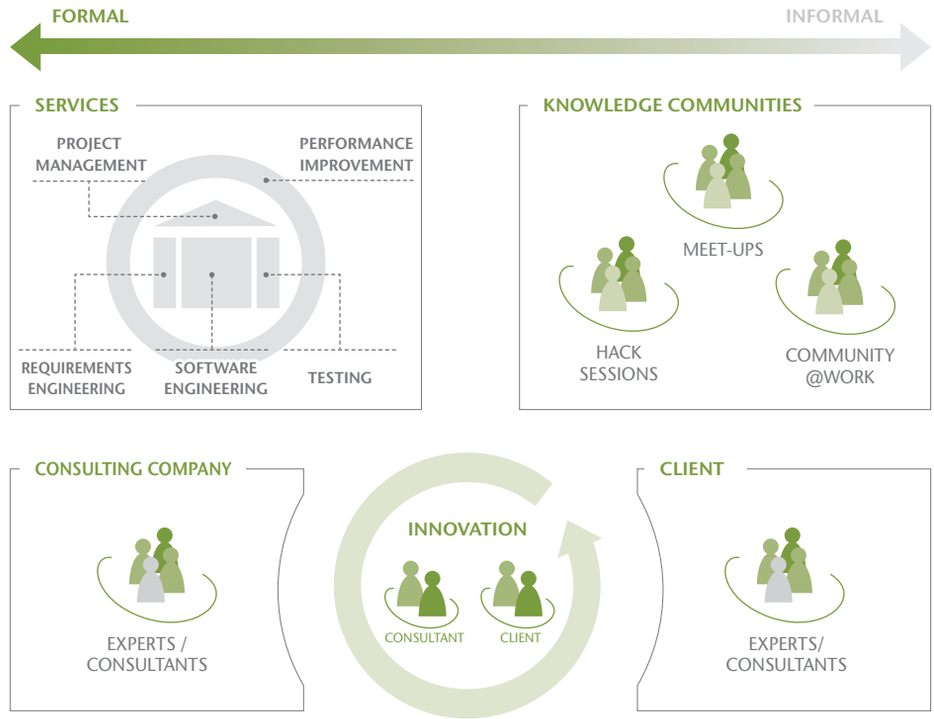
If we define innovation as a commercially successful modernisation process, then attention quickly turns to software development. Nowadays, in terms of performance and cost, the hardware component is usually already highly optimised — if not very flexible. We are witnessing a paradigm shift towards ever increasing device intelligence built into the software. In order to transfer this intelligence from our heads and into devices, processes and organisations must be set up to achieve the right balance between extracting and generating knowledge.

Knowledge communities have proven successful when finding this balance. Cross-departmental or cross-company networks represent a structured means of — first and foremost — safeguarding and sharing «horizontal», i.e. cross-process expertise.

Companies in all industries must ensure that their organisation's learning curve is steep, that willingness to learn is encouraged and that employees feel that their employer is interested in their continuing development. There are always different «types of expertise» in every company: the thinker, the doer, the networker, the expert, the «inspirer» etc. The trick is to bring these people, with all their knowledge, passion and experience together, and to create platforms where they can indulge their passion for experimentation and look into new ideas that have never been thought of before — let alone put into practice. At the other end of the spectrum in the organisation of cross-company expertise, is the structuring, formal processing and provision of knowledge

«Innovation arises from interaction between thinkers, doers, experts and users, when personal responsibility becomes a part of the transmission of knowledge.»

FIG. 1: INNOVATION THROUGH THE INTERACTION OF SPECIAL SERVICES, COMMUNITY ACTIVITIES, AND THE PROFESSIONAL EXPERTISE OF THE ADVISER AND THE CLIENT



content so that it is available both internally and for customer consultations.

Only consultants who engage with the knowledge community concept internally will be able to help their customers achieve a greater level of innovation themselves. There are a number of reasons for this: Firstly, they understand incentives are required to encourage a climate of innovation. Secondly, they are accustomed to drawing on the best practice of their network and making this expertise available to their customers. Thirdly, they are customer representatives, providing unbiased and critical advice while continually supporting the customer's progress. And finally, they are familiar with the methodology, such as how to use *(usually limited)* development resources as efficiently as possible so that practical innovations can be developed from innovative ideas.

Example 1

ESTABLISHING AN INTERNAL CULTURE OF LEARNING

When it comes to managing internal expertise for customer consultations, service providers are particularly aware that the focus is on problem solving and supporting customers on their journey without fixed expectations. In this respect, the journey is often the objective of the consultation service. If customers feel that their needs are understood, and that they are not receiving a standard solution, nor are they having a standard solution imposed on them from an outside party, their willingness to open up to previously unthinkable ideas and accept innovation as a continual process will increase. In order to help customers achieve this level of process maturity, the consultancy itself must have a methodical culture of learning and must expand on further specialist training options available to include interdisciplinary means and methods, which will be of benefit to the company and will enable innovative solutions to be developed. Existing knowledge must be documented and made available in the long term. This system will enable new employees to quickly acquire expertise whilst also providing fresh perspective. As important as it is to expect independent learning as an obligation of each individual, it is also important to lay the organisational groundwork. This means: developing a creative mix of platforms where seasoned consultants come together with young graduates, project managers who have a lot of customer contact meet geeks with highly specialised expert knowledge and enthusiastic «sellers» of half-baked ideas mingle with sceptics and pedants.

Key rules:

- Participants do not just meet in the virtual world but in the real world too
- From the outset, no idea should be *(de)*valued or called so crazy that it cannot at least be considered
- Allow experts in their respective fields to impart their knowledge and help them define their arguments
- Combine the informal sharing of knowledge with a «fun factor», the structured transfer of knowledge following a methodological approach
- Jointly derive new concepts from the ideas presented and transform innovation into a continuous process

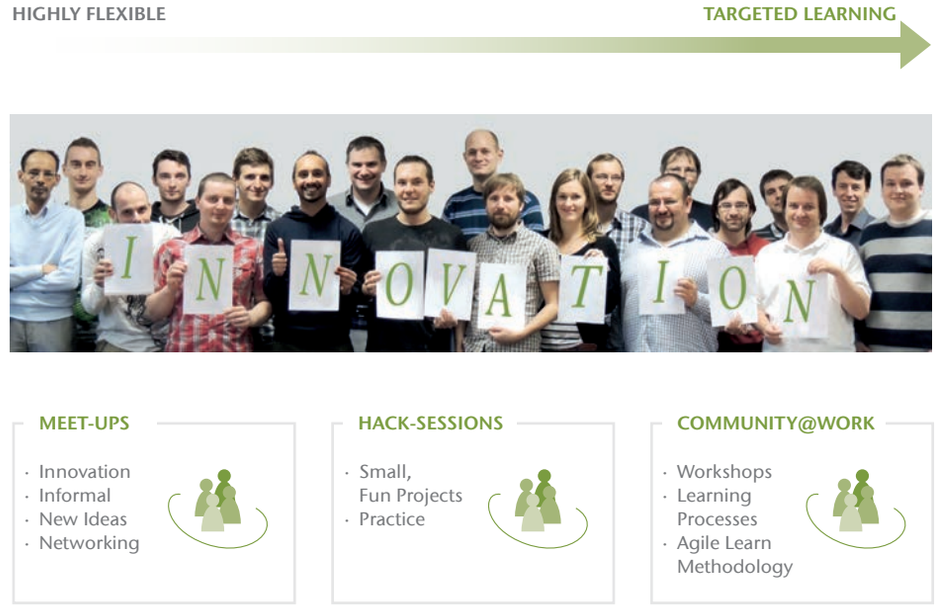
Consultancy service providers who adhere to these rules are investing in their employees and are providing the structure for an informal community:

1. Meet-ups: Sessions that take place twice a quarter *(or more)* and do not have a fixed agenda. The community selects both the content and the way in which it is organised *(presentation, group work, open forum).* The aim is to scrutinise existing methods and concepts by sharing practical experience and, if necessary, to come up with new ideas.

2. «Hack sessions»: Every month a kind of «play area» is created. All employees are invited to this play area and are asked to experiment with some smaller projects. The goal is to encourage enjoyment when working as a team and to motivate employees to be experimental without any pressure or specific aims.

3. Community@work: This platform is the bridge between the informal community and the formal structures of the organisation. The most mature ideas are

FIG. 2: THE ERNI COMMUNITY - TO SUPPORT A LEARNING CULTURE



There are always different «types of expertise» in every company: the thinker, the doer, the networker, the expert, the «inspirer» etc. The trick is to bring these people, with all their knowledge, passion and experience together and to create platforms where they can indulge their passion for experimentation and look into new ideas that have never been thought of before — let alone put into practice.

formalised in conjunction with process managers and product managers, transferred to the knowledge database and thus integrated into the structured knowledge of the organisation, meaning that it is available to employees performing consultancy tasks. This may include, for example, new product or service ideas, process optimisations or other expertise that will help the company move forward.

This ensures that a culture of continuous knowledge optimisation is created internally in which employees who appreciate a more relaxed creative working environment and those happier working within more formal structures are both taken into consideration.

If employees at all levels believe that they can contribute their strengths, develop on a personal level and drive the company forward as a team, this motivation and passion will automatically carry over into customer consultations. Customers benefit in several ways: from the knowledge of their consultant, from the experience of the consultant's network, from the methodologies implemented to make knowledge available, and from the openness to new ideas.

Example 2

MAKING EXPERTISE FROM THE NETWORK AVAILABLE

An organisation that coordinates educational institutions across the country is tasked with developing and implementing a piece of software that will simplify teamwork and harmonise processes. For many years, the individual institutions were organised on a local level and worked autonomously. As a consequence, a number of isolated solutions had been developed and the level of maturity of processes and structures varied considerably from region to region. There were also fears of losing authority over the information and processes within the institutions. The customer's project manager was therefore not only asked to formulate the requirements for the software to be developed, but also to establish uniform structures and processes for networking and information exchange in a heterogeneous environment. The project manager is supported by consultants from a consulting company. This is a highly complex change project, which needs to be tackled in its entirety on a number of levels, including strategy, project management, process improvement, coaching, requirements engineering etc. It begins with taking stock: What is already present in the systems; which processes are already in place and where; how can different needs be combined; is there a common denominator to unite them, if so — how big is it? Both consultants pick up on the community idea of knowledge networking and hold a series of workshops in which, step-by-step, all stakeholders on the customer side are involved. This is necessary because the whole organisation is facing a paradigm shift towards greater centralisation — in the broadest sense, the project also involves finding a kind of «cement» to bring diverging interests and sensitivities together and keep them together. The common denominator is therefore kept progressively small throughout the project, so that everybody involved can still identify with it and it can be used as the basis for defining a thematic block. The parties involved work together to group and channel all existing knowledge on this thematic block, for example by preparing sketches and visualizations or by testing other suitable means of structuring knowledge.

«A company-wide learning culture must be implemented and nurtured. Stimuli, methods and tools from outside the company can help create the basis for knowledge exchange and thus create a climate that promotes innovation.»

Then, for each special topic that is identified, the consultants select an expert on the topic from their organisation who already has experience with similar customer cases *(see Fig. 1)*. Over the course of the project, the two consultants function increasingly as the «spearheads» of a pool of experts, who in their role as guest speakers, coaches or moderators support their customers in individual workshops as they move toward a widely supported and sustainable solution. At the same time, the immense tacit knowledge of the project manager on the customer side is made explicit and is therefore made available for all stakeholders. In turn, this «explained» knowledge is used to mobilise the service provider's network, and the experts provide access to other specialists in related subject areas. The advantage for the customer: The experts do not only impart their best practice knowledge in relation to the customer solution, but they also share their experience of methods and tools for the moderation of the workshops and the channelling, structuring and clarifying of knowledge. An iterative procedure is then established, firstly by systematically collecting as much information as possible regarding the topic, then by setting this knowledge out in specific terms and subsequently opening it up for debate again.

The specific output: The customer obtains a comprehensive concept including proposals for the new system, relating not only to technological aspects, but also to strategic and procedural aspects. To help the decision makers understand the concept, the documentation is supplemented with visual elements to illustrate and simplify complex relationships.

The overall benefit: The customer has experienced, in a multi-step process, that innovation is a conscious process in which knowledge, experience and new ideas relevant to a particular situation are combined and the best way to achieve an objective is worked out in a holistic and understandable manner.

DISCOVER
ERNI Experience Digital

Read our magazine online now!

ERNI – Innovation in Process and Technology

JAZZ KANG
jazz.kang@erni.ch

Advisory Activity: Agile Coach, Software Engineering, Automated Testing Expert and ERNI Community Leader

JEAN-CHRISTOPHE DUMÉRIL
christophe.dumeril@erni.ch

Advisory Activity: Requirements Engineering, Project Management, Workshop Moderation and Training

THE WOW FACTOR IN SOFTWARE ENGINEERING

The better we are able to formulate tangible requirements, the greater chance we have of unlocking their potential for innovation.

The groundwork for innovation is laid during the requirements engineering phase. Developing structured requirements, grouping them clearly and prioritising them methodically for release planning form the basis for ensuring that the right features are beneficial at the right time.

BY MATTHIAS KÜNZI
AND FLORIAN RAMSBECK

Product life cycles are becoming shorter and shorter, and the speed at which the market demands innovation is increasing all the time. Thanks to the «Internet of Things», the interaction between device and human is becoming ever more interwoven: The devices that surround us are becoming more intelligent and are taking over an increasing number of tasks for users. In many cases, this intelligence can be found within the software. A software development process that enables a company to get a better product to market faster than the competition is a strategic success factor. A product is usually considered to be a «better product» if it sparks customer demand — but only if it can satisfy this demand. Reducing time to market is determined by how methodically the company works, from formulating and classifying the requirement through to the implementation of the derived user stories.

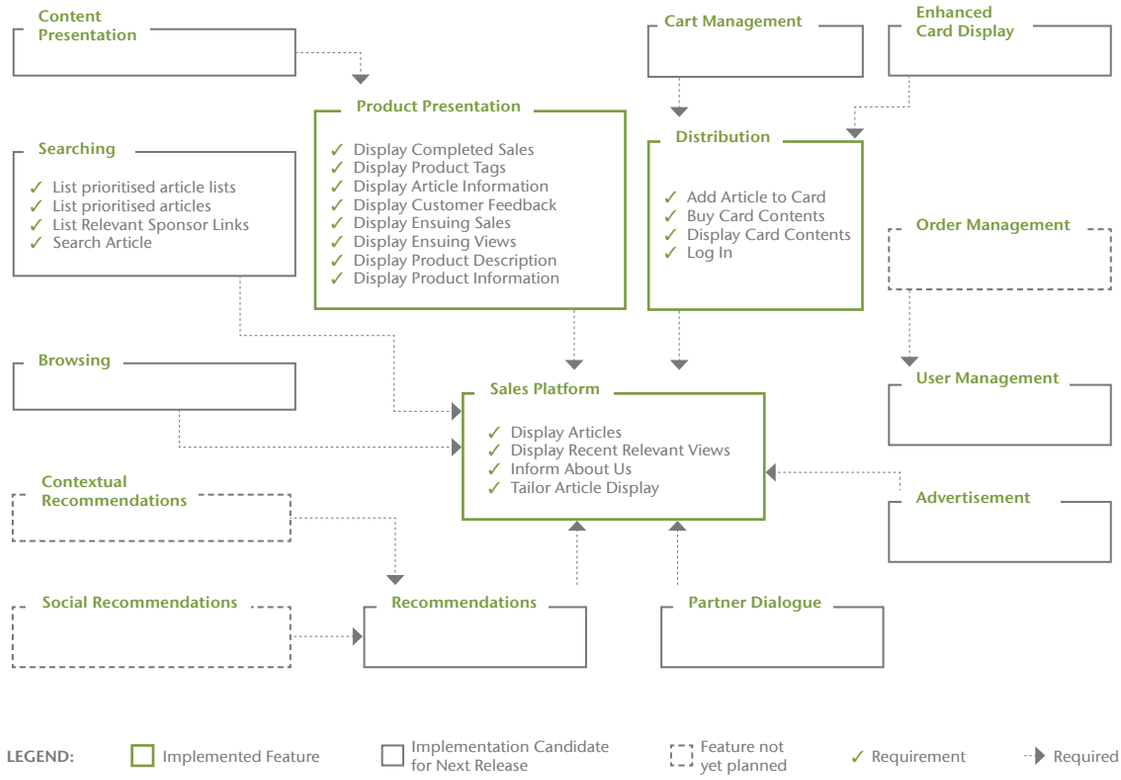
If one assumes that each unsatisfied market need or customer requirement corresponds to a product feature, it quickly becomes clear that requirements engineering is the key to developing innovative software solutions. But how does a company arrive at innovative requirements? How does a company prioritise requirements to ensure that the right features are developed first? What degree of abstraction do requirements need to have? And what tools are available to aid the formulation, classification and grouping of the requirements?

Here, external consultants can help at an early stage by assisting in the formulation of requirements — using their objective view point to break familiar patterns of thought and create an atmosphere that allows constructive work and cross-border thinking. External consultants can also provide methods and tools to drive innovation within the process. This leaves more time for work that really adds value. If requirements are formulated faster, structured better and classified more precisely, they can be developed more efficiently and companies can potentially release a pioneering feature onto the market before the competition. During the requirements engineering process, consultants, who have a number of properly trained experts at their disposal, ensure not only that it remains an innovative process, but also that it is then transformed into an equally productive implementation process. After all, no matter how innovative a requirement is, if it is implemented incorrectly or incompletely then the innovation will be lost.

It is essential that the end users and their requirements are the focus of those managing the project. There is no point working on an all-in-one, multifunctional product if it cannot then be sold on the market. It is better to get to market quickly with a fully developed feature, rather than to develop a number of technological refinements beyond the scope of the customer requirement. This requires working with customers and specialist departments to collate, group and depict in a clear manner the ideas, applicable features and underlying

«Consultants should encourage the willingness and nurture the capability of their customers, even taking a certain amount of risk – only then can a process of innovation be successful.»

FIG. 3: «FEATURE TREE» TO SUPPORT A LEARNING CULTURE



REFERENCES: «Release Planning with Feature Trees - Industrial Case – CRC» by Samuel Fricker and Susanne Schumacher, Blekinge Institute of Technology, Sweden

requirements on an abstract level in order to clearly communicate intentions, to bring all stakeholders into the loop and to ensure that the focus can be directed towards the priority issues. If external consultants have the appropriate creative methodologies and also establish structures that allow those involved to gain an overview of all the requirements, then they will enable their customers to achieve greater innovation. Indeed, not allowing customers to fall back into old ways of thinking over the course of the project, will ultimately help them to be successful. And what's more: Using simple tools, consultants can ensure that the innovation potential from existing, planned or determined requirements is channelled into a continuous release planning process. The biggest advantage in agile software development comes from the fact that not all requirements need to be fully defined right from the outset — instead, they are continually revised throughout the entire development cycle. Based on new findings and in keeping with customer needs, priorities can be continually re-established to ensure that a product comes onto the market at the right time and with the right combination of must-have criteria and wow factors.

Example 1

OPENING UP PATHS TO INNOVATION USING THE APPROPRIATE TOOL

An industrial company is the market leader in its sector and the undisputed driver of innovation in its field. The company requires a systematised overview of all the features of a large number of products and technologies already in its portfolio so that requirements can be correctly prioritised during new or further development: The overview should serve to provide detailed information about innovation potential, in which individual features are set out in terms of their trends, their current development status and their potential for further improvement. In this process, the customer wishes to open up new perspectives, enabling it to develop further still and thereby continue to create added value for its customers. If we consider that there are some successful sixth-generation products on the market, it becomes clear how much of an interest the company must take in gaining a new perspective on its set of features. For the product development release planning process, the company involves a strategic partner that has already succeeded in proving its worth to the customer with its pragmatic approach. A «feature tree» is developed for each product as a method of providing an overview of the requirements and ensuring that the release planning process is efficient. A feature tree is a visualisation of product characteristics, in which the original functions form the roots and further developments form the individual branches. This tool is expanded and adapted according to the additional needs of the customer so as to allow the company to work with it in the best way possible: The feature tree visualises specifications *(see Fig. 3),* depicts existing features of a predecessor product and provides links between the individual requirements for each vector. In this way, users can see at a glance how the features have developed over a certain period of time, which features are currently being worked on, which new features are already in the pipeline and which features may still be missing. The customer is impressed with the innovative approach of utilising an existing tool set and therefore making a big impact with minimal costs. The feature tree visualisation can also be used to bring together employees from a wide range of areas in the customer's organization because the pictorial representation is easy to understand and the relationships are depicted clearly. The customer can also use the same tool to break the specifications down to the level of detail required for development and therefore trace these specifications back without encountering any gaps in the process. The customer can plan its strategy for further product development, precisely estimate the costs of the project and prioritise and move forward with features in an extremely targeted manner. The consultant has demonstrated an understanding of the customer's requirements and implements a straightforward approach that saves on costs for the company and clears the way for forthcoming innovations.

Example 2

CREATING THE RIGHT ENVIRONMENT FOR CREATIVITY AND PRODUCTIVITY

A company in the medical engineering sector has identified customer needs for a new product generation by carrying out comprehensive market studies. The results of detailed quantitative and qualitative surveys of potential users have demonstrated that there is significant potential for innovation. The company wishes to use

FIG. 4: KANBAN CHART TO VISUALISE THE PROGRESS

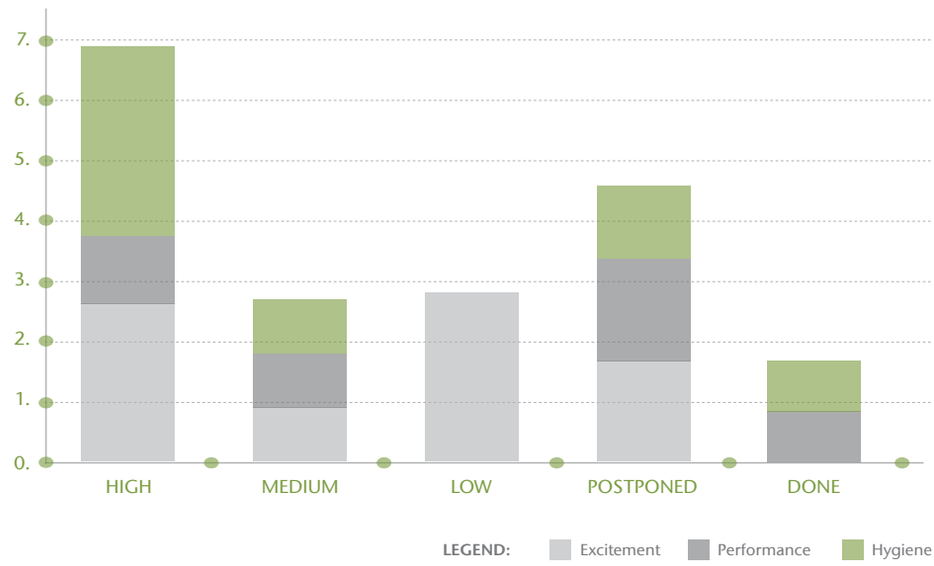
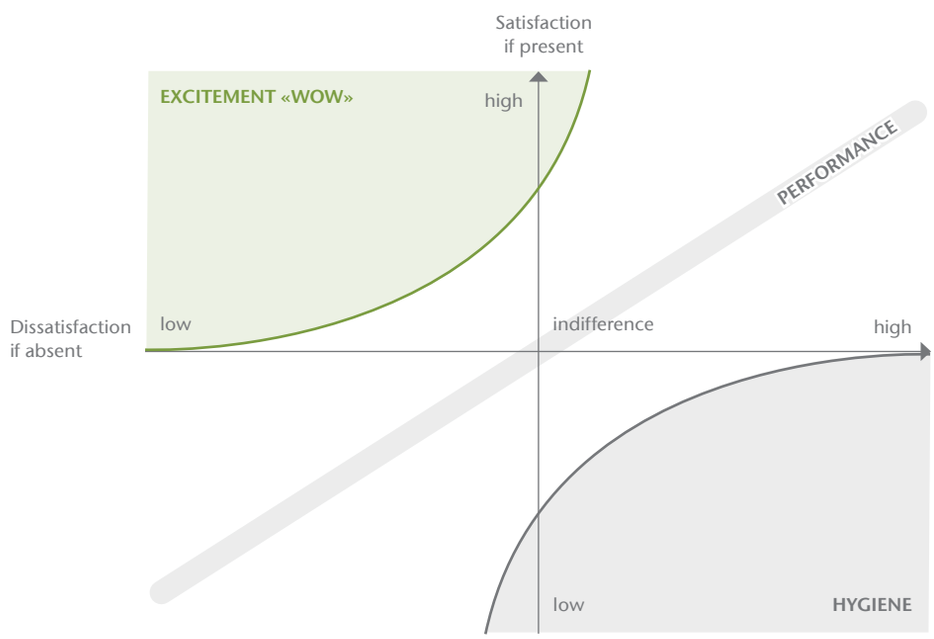


FIG. 5: KANO MODEL



this information to derive the requirements to improve existing products and to develop new products *(see Fig. 4)*. To assist with the visualisation and categorisation of the results, the company brings on board a technology consultant who has already worked with the customer for a considerable amount of time. The challenge lies in correctly interpreting the requirements collected from potential users and grouping these requirements into plausible clusters in terms of process steps. This means describing the process itself and assigning the appropriate requirements to each process step. It is also important to find the right level of abstraction, so that the basic concept of the requirement is formulated clearly and unambiguously and the developers are able to deduce the specification for the desired feature. It should also be taken into consideration that the industry is subject to strict regulation and therefore certain features must also be understandable to other stakeholders.

In order to assist the customer in the process, the technology consultant selects an innovative method that is unfamiliar to the customer. It highlights that the innovation of the product lies increasingly in its software. The objective is now to develop the correct cluster from the unstructured customer requirements with regard to procedural optimisations and the inclusion of additional functions. The commercial feasibility of the new procedure needs to be monitored during the process: Can the company develop the new product generation in such a way as to be profitable, and at the same time be technologically and medically feasible? To enable the customer to make the sheer volume of requirements manageable, the consultant approaches the task using the Kano model. Named after the Japanese professor Noriako Kano, the model allows us to determine the wishes *(expectations)* of customers in a structured manner and consider them during the product development process according to their quality level. In contrast to the usual 1-2-3 classification, applying a new method results in a new view of the processes, which in turn leads to new questions and therefore new answers *(see Fig. 5)*. Using the Kano model, it is also easier to visualise problems and make them more comprehensible for all of the various departments involved. Ultimately, the Kano classification method makes it easier for us to identify and focus on innovative features. The consultant has managed to make the whole process innovative in and of itself and to create a general framework in which innovation can thrive.

ERNI – Innovation in Process and Technology

MATTHIAS KÜNZI
matthias.kuenzi@erni.ch

Advisory Activity: Software Engineering, Project Management, Product Development and Processes in the Regulatory Environment (Medtech)

FLORIAN RAMSBECK
florian.ramsbeck@erni.ch

Advisory Activity: Requirements Manager and Project Management Support in the Regulatory Environment (Medtech)

EVERYBODY WORKING FROM THE SAME PAGE

Using Minimal Viable Products and Define-Build-Test teams, ideas are validated faster and software development becomes truly agile.

There are already several types of organisation and processes that are particularly good at promoting innovation. The common feature of all of these types is that they involve obtaining feedback from business functions, or even better, directly from the market, as quickly and as often as possible so that innovative functionalities can be developed further in a targeted and efficient manner.

BY JOFFREY ZEHNDER
AND PATRIC LENGACHER

New business models are now born in digital format. Businesses with the best chance of success are those that have already occupied a market before their product has been fully developed. Given this new way of thinking, it is not surprising that many methods that were originally applied to programming and software development can now be found in business strategy. Probably the most important elements of these methods are: feedback, communication and interdisciplinarity.

Agile methods in software development are based on close collaboration and require ongoing coordination in order to work properly.

The processes are strictly defined but they are also deliberately simple and kept to a minimum. However, this minimalism is supplemented by a large degree of communication and interaction between those involved in the project. A company making use of agile methods must be aware that it will continually be involved and must be prepared to invest time in the process. This form of collaboration requires a lot of mutual trust on the part of both the customer and the technology partner; it is a truly equal partnership. This is because agility creates transparency, and the corporate cultures of both partners must allow honest and fair communication between the two parties. This directness may well be a new experience and can initially cause some uncertainty — but this is outweighed by the benefits, which include: speed, focus on customer benefits, teamwork and added value. After all, innovation today rarely arises from the efforts of one single genius. Normally there is an entirely dedicated team behind an innovation, and often it is not something brand new — instead an innovation is simply an evolutionary improvement of something that already exists.

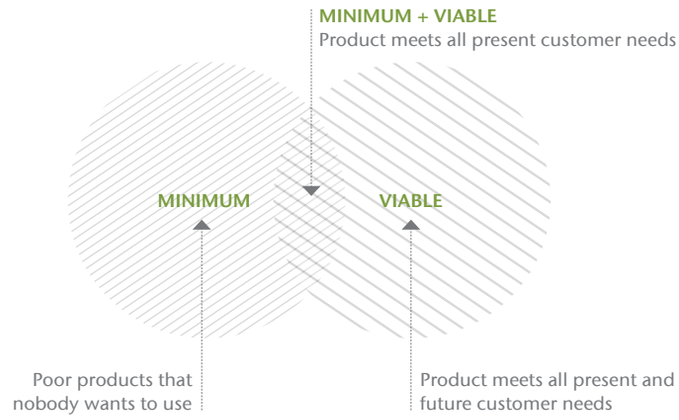
These types of innovation are accommodated for by agile methods and their frequent iterations. Feedback must be provided after each iteration at the latest. In detail, the feedback loop involves the following: The team presents to the specialist departments and users the requirements that have been fully implemented in functionalities in the current iteration, and receives comments, ideas and suggestions for improvements. The team discusses various options for implementing the new features and selects the ideal solution together — namely, the solution that involves the lowest possible costs and generates the highest added value *(see Fig. 7)*.

New options continually arise in the software development process. The faster decisions are made regarding the direction that further development should take, the more likely it is that a viable product will be developed. It is often the case that as suggestions for improvement come in and details are firmed up, the real innovative ideas come to light.

Originating from this idea is the concept of the Minimal Viable Product *(MVP)* — a product for which the first step is to invest

«Innovative ideas arise when a vision has already been translated into its initial stages.»

FIG. 6: MVP - MINIMAL VIABLE PRODUCT



only in the functions that are seen as absolutely necessary for the product's intended purpose *(see Fig. 6).* Behind this concept is the desire to enter the market with a viable product as quickly as possible so as to receive timely feedback from the end users, which can then be immediately integrated into the further development of the product. Specialist departments within companies often have a multitude of ideas about what the market may need. A minimum product is extracted from these ideas, which with minimal costs can achieve maximum value for the user. That is why an MVP is a very efficient way to check how the market reacts to an innovative idea. New requirements are gradually derived from the feedback, which are then prioritised and implemented as quickly as possible. Technology consultants who are dedicated to the progress and benefit of their customers will clearly demonstrate the value of this model to them and ensure that products go to market immediately, without waiting for all of the desired features to be implemented fully.

When using agile methods, service providers also make sure that they put together interdisciplinary teams so that people fulfilling different roles in the project can share information with one another quickly and seamlessly. This «Define-Build-Test» team *(DBT)* model is designed to reduce the development time and thus shorten the time to market. The background for this is that whenever requirements are documented

«If everybody involved in the project is jointly responsible for the creation of a new product, then there is nobody left to act as the scapegoat.»

there is scope for interpretation; after all, it is not possible to include everything that is desired and requirements often change during implementation. So, the closer the requirements engineer, developer and tester work together, the smoother the flow of information will be: Requirements can be scrutinised immediately, questions regarding comprehension can be asked and a common denominator can be defined. The team works closely with the specialist department to ensure that the user's perspective is included. It is crucial to not necessarily just do what business dictates, but also to permit questions about whether certain things could be implemented differently or even in a simpler way. In this respect, the DBT team mirrors and challenges the specialists. These specialists use their knowledge of the market to set out the product roadmap, and the DBT team estimates the technical feasibility and costs. This process results in constructive discussions and, in the best case, new ideas.

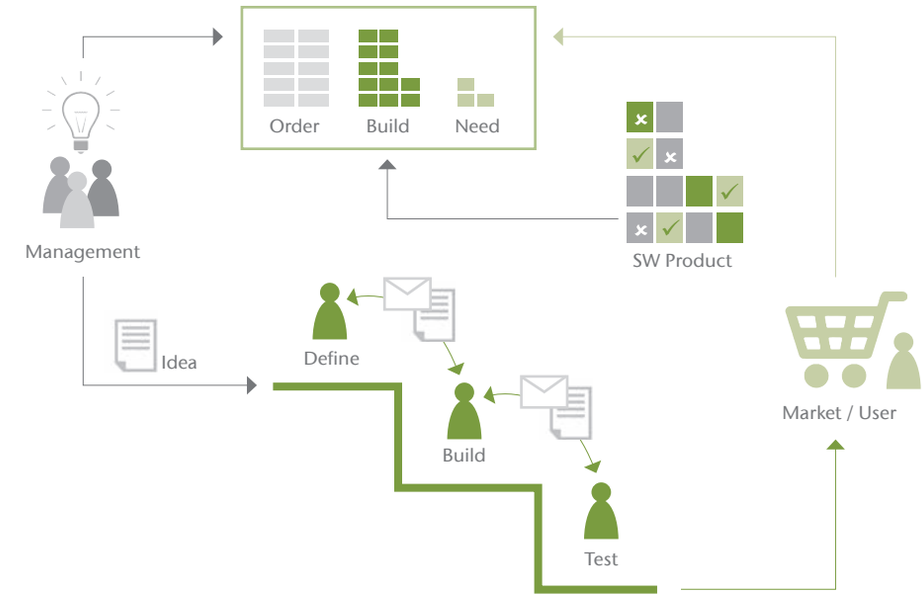
Using this approach, both the requirements *(or user stories)* and the acceptance criteria are defined. Testers can use the acceptance criteria to directly implement the functional tests of the user story in the same iteration and, if desired, automate these tests. This «Acceptance Test-Driven Development» approach *(ATDD)* is a very efficient way of achieving mutual understanding and allows developers to check whether or not they have fulfilled the requirement with their code at any time. This method therefore does not only generate innovative ideas through joint discussions between specialists, developers and testers, but it also improves the quality of the software. Technology consultants who set up a project with «Define-Build-Test» teams therefore support their customers on both an organisational and process level. This form of organisation sees a number of previously independent disciplines combined under one umbrella. The process no longer runs sequentially, but in parallel. Within each iteration, the team functions as a whole, and at the end of the iteration a fully tested and usable product has been produced.

Example 1
CREATING LINKS

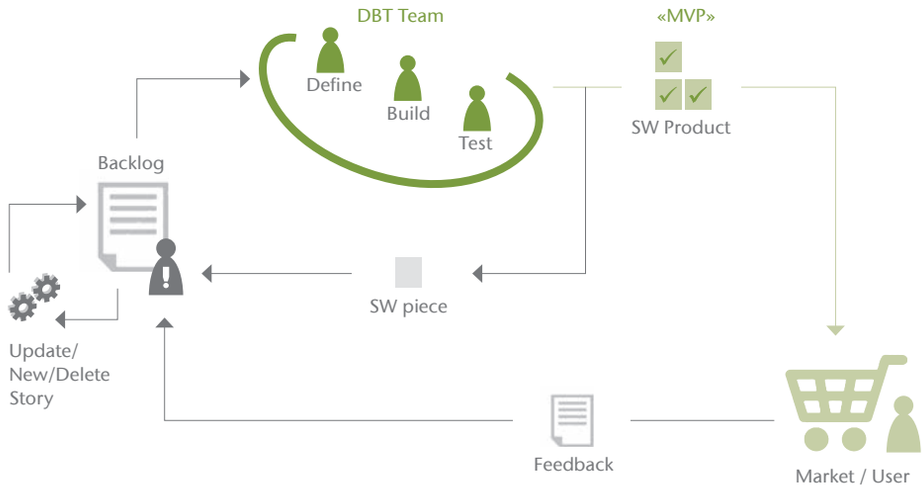
A company in the medical technology sector wants to develop data transfer middleware for portable measuring devices. The development process begins with the waterfall model, in which requirements engineering, development and testing are carried out sequentially. But this model soon meets its limitations: The speed of development cannot contend with the restrictions of the model or the changing requirements. Therefore, over time, agile methods are increasingly being applied in the development process. However, using agile methods means applying the iterative approach across the entire development chain and not just following the Scrum approach during the programming step within the waterfall process. While the developers are used to

FIG. 7: CREATE WHAT THE MARKET NEEDS!

OLD *(WATERFALL SETUP)*



NEW *(DBT / MVP SETUP)*



LEGEND: MVP - Minimal Viable Product
DBT Team - Define-Build-Test Team
SW - Software

this method, the testers and the responsible specialists are not familiar with Scrum and agile processes. Nevertheless, the co-operation between the business and the requirements engineer appointed by the technology consultant is very successful. One advantage is that the technology consultant has already gained a great deal of experience in agile software development. The consultant can therefore support the customer in deciding whether to return to and strictly adhere to the waterfall method, or whether to pursue a forward strategy and consistently employ the agile process model. The customer opts for the latter and the consultant recommends that the customer puts together a multidisciplinary Scrum team consisting of a requirements engineer, developers and testers to ensure that the agile software development is also implemented on an interdisciplinary basis. The requirements engineer drafts a first version of the user stories, which he coordinates with the specialist department *(product management)*. This position that the requirement engineer has within the team therefore means that he provides the decisive momentum that enables ideas to be incorporated more quickly and simply. The developers and testers then define the acceptance criteria of the user story in order to achieve a mutual understanding of the story, which is then implemented and tested in a Sprint.

The customer is very pleased with both what has been achieved and the new process model because it allows new requirements to be implemented much faster and much more precisely than before, when the specification used to be partly written months prior to development and the test result was then only made available to the specialist department months later. Another extremely welcome side effect is that all parties involved feel responsible for the product and that well-known silo mentality has abated considerably. The «quality first» approach, according to which a story can only be approved if it has been tested and found to be acceptable, ensures customer acceptance of the software. And last but not least, the developers and testers are a lot happier because the usual hectic rush at the end of a release to repair any final critical «bugs» prior to delivery of the software occurs to far less an extent.

ERNI – Innovation in Process and Technology

JOFFREY ZEHNDER
joffrey.zehnder@erni.ch

Advisory Activity: Requirements Engineering, Requirements Manager and Agile Enthusiast

PATRIC LENGACHER
patric.lengacher@erni.ch

Advisory Activity: Requirements Engineering

TRANSPARENCY AND AGILITY IN PRICING

Innovative pricing models are not ends in themselves; rather, they provide the scope for new ways of thinking whilst still offering budget security.

If the only incentive in software engineering is to undertake development at the lowest price possible, then this will be the end of innovation. A partner who cares first and foremost about the success of its customers is able to formulate innovation-friendly pricing models that go above the fixed price and the price ceiling in order to promote creativity and still provide cost certainty.

BY PATRICIA MEIER-MÄCHLER AND PHILIP LEHMANN

Innovation comes at a price. It requires time and scope — and the courage to allow both. Tight pricing models, rigid targets and rigorous controls may increase efficiency, but they also put the brakes on inspiration because unconventional ideas do not fit into this scheme. Therefore, when collaborating with a partner in software development projects, the pricing model selected is decisive in determining how much room there is for creativity. Accordingly, the basis for calculating the price is an important parameter when creating an innovation-friendly working environment. Naturally, all customers want cost certainty, deadline security and transparency regarding the value they will receive for the services. And here lies the crux of the traditional fixed-price and price-ceiling models.

Fixed price means: A binding scope of services and total price is agreed for the project. In this way, both the customer and the agent have budget security. Not only that: The customer can completely transfer its budget risk over to the partner.

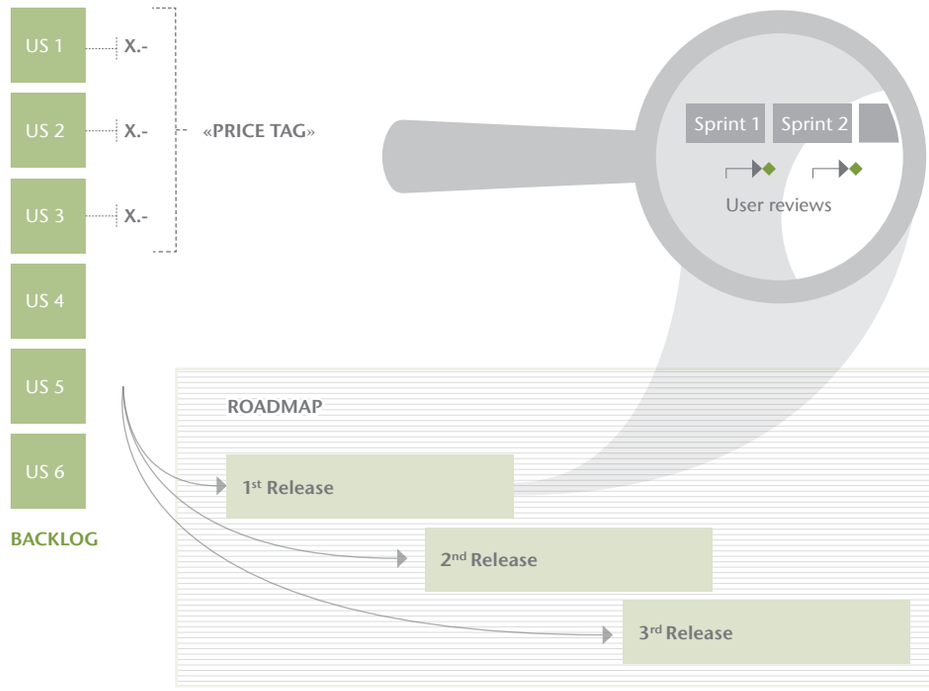
But pursuing this model means that the requirements are specified in full before the project is awarded and, above all, that they remain unchanged over the course of the project. Changes made during the project must be implemented in an expensive change management process. In order to provide a certain amount of flexibility within the framework of the contract, there is some room for change within the scope of services. However, the fact is, and remains, that this model does provide the incentive for production to be as cheap as possible. The bottom line with a fixed-price model is that costs are limited, and so is the scope of services. Anything else required must be calculated in addition to the fixed price, which entails renewed offers and more price and contract negotiations. In such an environment, new ideas are not seen as an opportunity — they are seen, in the worst case, as a disruptive factor that decreases the efficiency of the project.

At the other end of the spectrum, price-ceiling models are based on the fact that the services of the service provider are generally billed on a time and material basis, with both parties agreeing on a binding maximum price. The customer therefore pays for the actual hours worked but only up to the defined price ceiling. Although this model is slightly more flexible if requirements change or new ones are added, the customer can either easily lose control over the costs or may end up with a capped fixed-costs model. For service providers, innovative ideas in this scheme are fraught with risk because they are responsible for complying with the price ceiling and rarely benefit from this risk.

Today, however, more flexible calculation mechanisms are increasingly required for newer, more agile software development methods — calculation mechanisms that do not define the project scope from the outset and therefore restrict development. If the development process is agile then the pricing needs to be agile too. Agile pricing

«Innovative pricing models form the basis for stable, long-term partnerships between customers and service providers that offer both parties plenty of freedom.»

FIG. 8: «PAY PER USER STORY»



LEGEND: US – user story

The basis for calculating the price is an important parameter when creating an innovation-friendly working environment. Naturally, all customers want cost certainty, deadline security and transparency regarding the value they will receive for services delivered.

initially originates from the approach of not assigning the price to a team or unit of time, but to a feature or a story point — i.e. a unit that describes the scope, the complexity and the properties of a requirement. The requirements are prioritised in the course of the specification and the release planning process and then each is assigned to a Sprint. The advantages are clear: Requirements can be adapted flexibly and their priority increased or decreased. This has no effect on the price. But it certainly has an effect on the climate for innovation: There is no need to clearly define what the end result will look like at the beginning of the project. This means that those involved have the freedom to think and develop the product. If the customer and agent have agreed on a design method, both parties benefit from sound budget security and minimal change management processes, which are already established within the agile models (Sprint planning and review).

The interests of the parties involved are carefully balanced during the pricing and contractual arrangements, which follow the «pay per story point/feature» concept: The customer receives investment security in the form of a mini fixed price for the implementation of a specific requirement, and the provider assumes responsibility for the implementation and quality risks of this requirement, while the risk involved in defining the functional scope as precisely as possible remains with the customer. This concept therefore has the positive effect of encouraging both parties to think innovatively: By employing new approaches, the provider strives to ensure that requirements are implemented as efficiently as possible and that they are of the highest quality, and the customer endeavours to prioritise the requirements as effectively as possible and to positively tackle the relevant risks. The single most important thing a consultancy can bring to this type of collaboration is trust and transparency. Trust and transparency help establish real and long-term development partnerships, in which risks and opportunities are shared fairly and the collaboration allows, and even encourages, innovative thinking. Good, professional service providers are not necessarily ones that develop highly innovative price models, but rather ones that create a climate that promotes innovation and comprehensively assure customers that their services will bring lasting benefits. While the «pay per user story» model is suitable for smaller projects, creativity in more complex projects can be channelled optimally using the «pay per story point» model. More information about the two models and the potential situations in which they can be used is provided below using practical examples.

Example 1
«PAY PER USER STORY»

A provider of mobile applications is constantly developing new ideas for innovative business apps. The company has tasked a technology consultancy company specialising in software engineering with implementing the App. The first two releases of the application are billed according to the fixed-price model with a defined scope of services. The consultancy company quickly notices that this model is stifling the creativity and innovative potential of the customer. The constant flow of new ideas and the requirements for innovative features cannot be adequately covered by the change management process. The consultant therefore suggests giving a price tag to every user story. The price covers a cost estimate for the specification of the requirement,

development, testing and project management, as well as error correction and final acceptance *(see Fig. 8)*.

The customer defines the priorities regarding whether the features will definitely, probably or possibly be implemented. Features that have not yet been started on can also be removed from the scope of services or new features can be added.

The customer receives an overview of all the features with a suggestion of how the features should be prioritised based on the likelihood of implementation. The customer is impressed with this and decides to order features «from the catalogue». For the customer, the new price calculation means a fully flexible scope of services; the service provider takes on all of the productivity risk. This benefits both parties: The customer controls the time to market of each functionality, and the technology company is responsible for efficiency and quality. The incentives and risks are evenly distributed and the customer is motivated to maximise innovative potential.

Example 2
«PAY PER STORY POINT»

A customer in the security sector has implemented new web-based technology and has developed the company's products further based on this technology. The customer enlists the services of a consultancy for the update of a module and enters into a development partnership with this company. The customer and supplier agree on a «story point» pricing model. A «story point» is a unit that describes the scope or complexity of a requirement. «Story points» can be defined differently: Sometimes it may be the complexity of the task and other times

«Innovation means that customers select the features that promise success and service providers give customers freedom to innovate as they develop their solution by allowing the scope to be extended or modified as required.»

it may be the overall structural properties within the user story. However the unit is defined, it does not have anything to do with the amount of time required to develop the feature, but rather is a figure that is defined in relative terms. It is also agreed with the customer which services are to be included in a «story point». These are defined in relation to any services to be rendered in the future. The basic assumption is: The customer wants to fully utilise its budget and achieve a maximum number of features within a certain delivery period. Nevertheless, the partner should be liable for the quality and also have an incentive to deliver high quality and to invest in test automation. This is ensured by also including a warranty of quality in the «story point» price. It is therefore in the consultant's interests to optimise processes, tools, integration and automation needed to minimise future costs and make the team more efficient. At regular intervals, the customer receives an overview of the features that have already been developed and an overview of the backlog of features that are yet to be implemented. This allows all the creative ideas of the specialist department to be mapped by IT. In each case, the customer decides whether the requirement unit for the respective fixed price at a given time is sufficient for development and the service provider plans its resources accordingly. The result is that the customer has an exact overview of which user stories are being implemented in which Sprint and can choose freely which one to develop next. The service provider can control its own productivity, use its agility to properly meet the customer's needs and optimally fulfil its responsibility to develop a functional, value-adding piece of software.

ERNI – Innovation in Process and Technology

PATRICIA MEIER-MÄCHLER
patricia.meier@erni.ch

Advisory Activity: Project Management and Requirements Engineering

PHILIP LEHMANN
philip.lehmann@erni.ch

Advisory Activity: Project Management and Business Process Improvement

ERNI
enables & delivers

http://erni-consultants.com/digital-publication/en

PUBLISHER'S DETAILS

Publisher

ERNI Consulting AG,
Baar · Bern · Lausanne · Zurich

ERNI Consulting España S.L.U., Barcelona

ERNI (Deutschland) GmbH,
Frankfurt · Munich

ERNI Development Center Philippines Inc., Manila

ERNI Singapore Pte Ltd., Singapore

ERNI (Slovakia) s.r.o., Bratislava

Editor
Tatiana Abrhanová, ERNI (Slovakia) s.r.o.
Tel. +421 2 3255 37 43
leserservice@erni.ch
http://erni-consultants.com/digital-publication/de

Translation
SDL Multilingual Services GmbH & Co. KG,
Stuttgart

Layout
Katarína Beinrohrová and Diana Cencer Garafová

Production
von Ah Druck AG, Sarnen

Circulation
4000 copies *(German)* + 1000 copies *(English)*
Published quarterly

ISSN 2235-7262

ERNI

enables & delivers

www.erni-consultants.com