EVALUATING BUSINESS MODELING TOOLS FROM A CREATIVITY SUPPORT SYSTEM PERSPECTIVE – RESULTS FROM A FOCUS GROUP IN THE SOFTWARE DEVELOPMENT INDUSTRY

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Abstract

Business modeling tools provide IT support in the complex process of business modeling. Little research exists on the evaluation of business modeling tools. We interpret business modeling as a creative process and evaluate a specific business modeling tool (OctoProz) by assessing its potential for fostering creative performance. We draw on literature on the design of creativity support systems, that is, the components for collaborative idea development, and position our business modeling tool as a creativity support system. We conduct a focus group study in the software development industry, collecting qualitative data on creativity-specific tool properties of OctoProz: playfulness, comprehension, specialization, and collaboration. The results show that task-specificity of the tool was highly appreciated by the business modeling experts, while improvements are needed with regards to playful interaction with the business model and support of comprehension of the business model. Real-time collaboration in the modeling process over-satisfies the experts’ needs. Our findings contribute to the purposeful design of business modeling tools. Further, the results suggest that the components for collaborative idea development are valid, while aspects of GUI design and collaboration modes require further attention. We finally indicate limitations and future research directions.

Keywords: Business Modeling, Creativity Support System, Components for Collaborative Idea Development, Evaluation, Focus Group
1 MOTIVATION

As companies are forced to continuously innovate their business to stay competitive, business modeling is becoming increasingly important (Casadesus-Masanell & Ricart 2011). Developing and structuring business ideas can be considered a key activity in the innovation process. To derive a generally accepted innovation strategy, merging the ideas of different stakeholders at different points in time calls for both methodological and technical support. A plethora of methods and tools are available for different phases within the innovation process, reaching from brainstorming support (e.g. Derosa, Smith, and Hantula 2005; Fjermestad and Hiltz 1998; Osborn 1957) in early phases, to more structured approaches such as process modeling in order to further develop the core processes of the business idea (Kettinger, Teng, and Guha 1997). With regards to technical support of the core business modeling process, there is a wide range of different tools available in practice, which implement different methodologies, including the business model canvas (BMC) (Osterwalder and Pigneur 2010), STOF (Bouwman, Faber, Haaker, Kijl, and de Reuver 2008) or e³-value (Gordijn and Akkermans 2001).

A big share of contributions in business modeling presents new methods and tools. However, not much research has been conducted on the evaluation of these artifacts, especially on tools. This is partly because a comprehensive evaluation scheme is still missing in literature. Not much work has yet been published on evaluating business modeling tools along defined criteria or by means of a structured approach. While there are several works on evaluation criteria for particular business models e.g. in the context of e-commerce (Hughes et al. 2008; Gordijn & Akkermans 2001; Sharma & Gutiérrez 2010), research lacks a clearly defined evaluation framework for the technical tools that support the creation of these models. Moreover, many works focus on methodology development or refinement rather than tool implementation when it comes to business modeling. Design guidance is still missing.

However, evaluation criteria have been developed in related disciplines like process modeling (Bandara et al. 2005) or creativity support (Voigt & Bergener 2013). Regarding the latter, creativity can be seen as important factor for developing innovative ideas (Amabile et al. 1996). Especially during the early phases of crafting a particular business model, creativity is needed in order to come up with novel and useful ideas. Thus, regarding tool support, business modeling tools can be positioned as creativity support systems (CSS) as they are to foster and support the development of creativity creative products, such as business models. Moreover, collaborative business modeling tools need to implement characteristics of group creativity support systems (GCSS) to take advantage of creativity enhancing mechanisms in (distributed) groups. Consolidating information and opinions of different stakeholders has been discussed as a key factor for developing innovative business ideas (Brentani 1991).

The perspective of CSS can be considered a valuable approach to develop suitable criteria for business modeling tool evaluations. From that premise, we conduct a focus group tool evaluation of the business modeling tool OctoProz to provide an answer for the following research question:

RQ: What can we learn on the purposeful design of business modeling tools from a creativity support system perspective?

The remainder of the paper is structured as follows: In the next section we present related work on both business modeling and CSS evaluation. In Section 3, we present the conceptual design and implementation of our business modeling IT artifact OctoProz. In Section 4, we present our evaluation research model, followed by the research methodology. In Section 5 the results of the evaluation are presented and discussed. An outlook on promising steps for future research is provided in Section 6.
2 BACKGROUND

2.1 Business Modeling

Business modeling has been established as an approach to develop and structure new business ideas (Magretta 2002). Although the term business model and even the associated process of business modeling is widely spread, definitions vary and authors disagree on constituting elements of such models (Al-Debei & Avison 2010). In literature, two major opinions on the definition of the term exist: On the one hand, business models can be seen as general ideas for value creation (Porter 2001). According to this understanding, the term is used simply to describe the way a company is doing its business (Galper 2001; Gebauer & Ginsburg 2003). On the other hand, concentrating to a lesser extent on the key objectives of an organization the term business model is referred to as a graphical representation of the constituting elements and the business logic of the organization (Osterwalder 2004; Osterwalder et al. 2005). In this paper, we follow the second definition. Therefore, we understand a business model tool as the implementation of the graphical representation of the pencil-and-paper application.

Different methods to create business models exist in literature (e.g. Osterwalder & Pigneur 2010). In this article, a newly proposed process-oriented method is used (Becker et al. 2013; Malsbender et al. 2013). The method divides business models in the four areas of value propositions, processes, resources, and financials. This method will be implemented in the artifact OctoProz.

2.2 Creativity Support Systems

Creativity can be seen as key factor for developing innovative ideas (Amabile et al. 1996). In the early phases of crafting a business model, creativity is needed in order to generate novel and useful ideas. Therefore, business modeling can be regarded as a creative process and, thus, business modeling tools can be understood as creativity support systems (CSS). There are several major research areas focusing on the implementation of creativity support by means of IT. These include e.g. knowledge management systems (KMS), decision support systems (DSS), and group support systems (GSS). In this context, most research is targeted towards conducting experiments using the actual outcome of the process as dependent variable. Here, especially the number of ideas that are generated or the quality of these ideas (e.g. in terms of novelty, value, etc.) are used as measures. In addition, some studies focus on usability aspects of the particular tools.

However, despite existing indications on the potential CSS holds for increasing creative performance, no distinct design guidelines have been developed. Experiments show very mixed results, not only across different instances of similar experiments but also for the treatments within one experiment. For instance, in a study on KMS support for idea generation, highly creative individuals did perform significantly less creative (judged by idea quality) when using the KMS (Cheung et al. 2008). Furthermore, a study on the comparison of two creativity-enhancing DSS with one conventional DSS indicated that only one particular treatment within the former generated more creative responses, while the other treatment generated less creative results (Elam & Mead 1990). In addition, it was found that idea repositories, as components of a GSS, which contained ideas unrelated to the current problem, lead to more novel ideas than repositories with ideas that fit the problem (Satzinger & Garfield 1999). However, the effects of other GSS components, e.g. for communication or idea documentation, were not tested within the experiment.

Taking into account the existing research, we see the need for rigor design-oriented research on CSS. There needs to be a thorough evaluation of specific design principles and architectural choices with regards to creative performance. In all empirical work we analyzed, the CSS was taken as “matter-of-fact”: researchers used industrial standard tools only and treated the tool design as a black box. Not much attention has yet been devoted to the specific design parameters of the tools used to support
creativity. Our current study of business modeling tools will set out to close this gap. Within our research we provide empirical data on the perception of tool components and features under the perspective of creativity support.

3 ARTIFACT DESIGN

3.1 Conceptual design

Creativity is commonly associated with the development of creative products which are novel and useful. Both characteristics can be seen as quality criteria for business models, in that the models need to conceptualize innovations which are new to the market, and which provide customer value. In that sense, we interpret business models as creative products. A Creativity Support System (CSS) is an information system type which aims at supporting the development of creative products. Group CSS (GCSS) are specifically tailored to the support collaborative creative processes. We position OctoProz as a GCSS, which should enhance the creative performance of groups.

OctoProz follows the architectural guidelines for GCSS, developed by Voigt & Bergener (2013). The guidelines propose six interrelated system components, referred to as components for collaborative idea development. The gathering and sharing of first, rough ideas is supported by the component shared idea space. The production and documentation of ideas is supported by the shared idea editor. Mutual inspiration of group members for generating novel ideas is facilitated both by the shared idea space and the shared idea editor. Moreover, a communication component facilitates communication in divergence. The individual inspiration component, providing stimuli to individuals to enhance idea generation, is an optional, non-group specific component. A shared idea space visualizer helps to organize and reduce the complexity of the ideas that have been generated and collected. The assessment of ideas is supported by an evaluation component, allowing to vote for or comment upon ideas. Last, the selection of ideas for further elaboration requires support for decision-making within the group. To that end, the communication component is required, which also provides for reciprocal inspiration. Accordingly, the communication component supports both divergent and convergent processes. The shared idea space is the component where the ideas are “administered”. It is the central component, which integrates all other components and thus supports both divergence and convergence.

In Table 1, we relate the features and components of OctoProz to the GCSS components. OctoProz is a tool for the refinement of initial business ideas to complex business models. Thus OctoProz has an emphasis on collaborative model design; thus the individual inspiration component is out of scope.

<table>
<thead>
<tr>
<th>GCSS Architecture Component</th>
<th>OctoProz Component and Features</th>
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</thead>
<tbody>
<tr>
<td>Shared idea editor</td>
<td>• Modeling component: collaborative model editing, view of users currently online, business model creation supported by a wizard, assessment of financially critical process activities, syntax check, creation of variants, undo/redo of changes to the model</td>
</tr>
<tr>
<td></td>
<td>• Financial analysis component: guided five-step calculation process for cost and revenue estimations</td>
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<tr>
<td>Shared idea space visualizer</td>
<td>• Model management component: sorting, searching, and grouping of related business models (including variants)</td>
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<tr>
<td></td>
<td>• Print format export of business models, single business models may be exported to PDF</td>
</tr>
<tr>
<td>Evaluation component</td>
<td>• Comments: discussion of business model details (qualitative)</td>
</tr>
<tr>
<td></td>
<td>• Model rating: assessing business models with five-star voting (quantitative)</td>
</tr>
<tr>
<td></td>
<td>• Financial analysis component: Financial assessment of business models based on KPIs</td>
</tr>
<tr>
<td>Shared idea space</td>
<td>• Model rights management component: management of user rights (model owner, read, write) for business models</td>
</tr>
</tbody>
</table>
Table 1. Components of the GCSS architecture and their implementation in OctoProz

3.2 Implementation

Based on the conceptual design and the background presented above, the tool was implemented by a team of researchers (Figure 1). Implementation of the current prototype took place between March 2012 and February 2013. The prototype was built as a rich internet application using Ruby on Rails and Asynchronous JavaScript.

Figure 1. OctoProz: Screenshots

In the model management screen (top part of Figure 1) each user can access all business models s/he has permissions on. The models are listed with their name, description, tag, the corresponding
permission of the user, information on the date of the last update, and the rating. The table is sortable with regards to all categories. Moreover, the user can search for business models using the search field in the last row. Business models are organized using a tag to allow the comparison of related models. The model management screen also allows for the creation of new business models and the import of business models from Microsoft Excel. The model management screen can be reached via the “my business models” link in the top bar or directly after logging into OctoProz.

From the model management screen, the modeler can access the modeling environment (lower part of Figure 1) either by creating a new model or by editing an existing one. In the center of the screen the modeler can create the business model using the methodology proposed by Becker et al. (2013). New value propositions, process steps, resources, and financials can be added, removed, or refined. Moreover, drag-and-drop can be used to rearrange model elements.

The top buttons in the modeling environment allow the user to open a wizard (help) which guides the creation of a new business model. The undo/redo-buttons are used to correct mistakes in the modeling process. The finance button gives access to two different functions. First, the system allows coloring all rows of the business model according to their costs or revenues. Second, the modeler can open a financial analysis module. This module allows a first evaluation of the financials of the business model. In five sub-steps, the user can analyze the process-dependent financials (what are the costs of resources and process steps), the central function financials (what are the fixed costs of central resources and functions), the process duration and iteration (how often is the service provided), the one-time investments (what are the set-up costs of the new service), and the final calculations (what is the return on investment or the time of breakeven). The sharing button allows users to share the model with other users. Here, the owner of the business model has to enter a valid e-mail address and has to select between read, write, and owner rights. An invitation is sent to the potential collaborator. Users with read rights cannot edit the model. Users with write rights are allowed to edit the model. The copy button allows users to create personal copies of the model.

The export button enables users to export the model to PDF, Microsoft Excel, and to the ARIS Business Architect from Software AG. First, the PDF export allows easy printing of the model. Second, with the Excel export the user can use the information gathered in the business model for further financial calculations. The user can also edit business models in Excel and re-import them later. Finally, the ARIS export allows for detailed process modeling. The syntax check button opens the syntax check view on the right. Potential errors are indicated, e.g. when resources have no costs. However, the user can always opt to ignore these alerts in order to maximize modeling freedom. The comments button opens the comments view on the right. Here, each model user can comment on the model in plain text, independent of their corresponding rights. Lastly, the currently online button informs all users about other users currently watching the model. The model is locked by the first user with write or owner rights when opening the model. Only this user can edit the model. The changes are pushed to the watching users in real time. The locking user can also transfer the lock to other users with the appropriate rights when clicking on the yellow transfer lock button. In the upper left corner of the window, each user can also rate the model on a one to five star scale. The average rating is shown to all users.

4 EVALUATION METHODOLOGY

4.1 Exploratory Focus Group

There is consensus in design science research that evaluation of design theories and artifacts is an essential step of the design research process (Kuechler & Vaishnavi 2008; Hevner 2007). We apply the method of exploratory focus groups (EFGs) serving artifact improvement: “For the evaluation of an artifact design, exploratory focus groups (EFGs) study the artifact to propose improvements in the design” (Tremblay et al. 2010, p. 121). A focus group is defined as a group of people discussing a
subject under the supervision of a moderator (Stewart et al. 2007). Here, the subject was the design of the presented artifact.

The evaluation results contribute to the body of knowledge on purposeful design of business modeling tools. Moreover, we aim to evaluate the architectural guidelines for GCSS (Voigt & Bergener 2013), which is the design theory underlying OctoProz. According to Venable et al. (2012, p. 425), “when an artifact is evaluated for its utility in achieving its purpose, one is also evaluating a design theory that the design artifact has utility to achieve that purpose” (Venable et al. 2012, p. 425).

**Expert selection.** We conducted our focus group interviews with four experts (Expert A, B, C, D) of a business software development and business process consultancy company. Our experts are project managers, managing both business and research projects, with at least 3 years of working experience in that field. They are specifically suited for the evaluation of our business modeling tool for two reasons: Given that the organization of our experts is a software development company, a common deliverable of the research projects of our experts is software. As such, the experts are capable of providing conclusive feedback on the features and interface design of OctoProz. Second, an important aspect of the research projects which are managed by our experts is the commercialization of research & development (R&D) results of their projects. In consequence, our experts are experienced in developing business ideas and business models as market realizations of the results of the research projects. One expert conducted a research project in the specific area of business modeling.

**Focus group procedure.** The overall focus group session took about two hours. We first familiarized the experts with the OctoProz framework. We then presented the OctoProz tool in a live demonstration, modeling an exemplary business model. During the demonstration, the experts were free to ask any question or impressions about the tool design. After the tool demonstration, we asked our experts to provide feedback on their impression of advantages and disadvantages single components of OctoProz. When discussions were related to our evaluation criteria (next section), we asked follow-up questions. To prevent evaluation bias, the evaluation criteria was not communicated to the experts.

**Data collection and analysis.** During the focus group session, one of the two focus group moderators took notes. Further, the session was tape recorded. The experts’ feedback was then transcribed and triangulated (Yin 1994) with the notes. The data was analyzed in a process of selective coding (Strauss & Corbin 1998), searching and interpreting data related to our evaluation criteria.

### 4.2 Evaluation Criteria

The tool properties playfulness, comprehension, specialization (Voigt et al. 2012), and collaboration (Kratzer & Engelen 2006) are supposed to positively impact on the creative performance on the tool users (Figure 2). We built on that assumption and analyzed our evaluation data in order to gain insights to which extent the four properties are reflected in our tool OctoProz. Playfulness, comprehension, and specialization are three central latent variables defined in the unified design theory of CSS (Voigt et al. 2012):
Playfulness is the property of a tool to encourage unfettered trialability in design, helping the user to push intermediate solutions to final results iteratively. It includes the support of iterative development of (intermediate) creative products, the provision of simulation functionality, comparison as simultaneous representation of diverse sets of alternative data, and modification for altering of the problem of the creative task.

Comprehension is the property of a tool to foster a rapid and clear understanding of the artifacts employed for idea development. It is based on rich representation of the data used for idea development, a holistic view of high quality visual data, the possibility of naturally interacting with the creative product, and providing constant visual groundings while developing the creative product.

Finally, specialization is the property of a tool to provide the user with task specific support and to allow selecting and arranging this support for future re-use. It includes the provision of special purpose tools, allowing arranging this functionality in environmental tool configurations, customized to the needs of a task at hand, and integrating all graphical interface components to an overall development tool.

The aspect of collaboration is fundamental to an individual’s intelligence and (Csikszentmihalyi & Sawyer 1995). Working together in teams for solving creative tasks is common practice in industry: in an exploratory empirical study of 44 R&D teams, Kratzer et al. (2006) show that the creative performance of virtual teams is influenced by the proximity of team members, communication modes and task coordination.

5 RESULTS AND DISCUSSION

5.1 Playfulness

Iterative model development. In OctoProz business model variants can be created by copying a business model and modifying that copy. Expert A was curious whether the tool supports version management of business model copies, indicating which modifications had been made by which user. Currently, this functionality is not provided in OctoProz. However, we were sensitized for the
necessity of functionality of model version management, giving the business modelers control on the progress of the collaborative, iterative business model development.

**Business model simulation.** Simulations in Creativity Support Systems allow users to playfully test alternatives of creative products. Expert B stated the following:

“Process simulation is something I miss in your tool. You can only use fixed process activity values. [...] What you will usually do in the business modeling process is something like a worst-case scenario. So you should provide playful simulation functionality, in which you can provide ranges instead of fixed values, including probability distributions.”

Thus, to increase the playfulness of OctoProz, we should consider implementing simulation functionality, which allows to automatically calculating different financial estimations in accordance with ranges of values in service process step duration, cost of resources, etc.

### 5.2 Comprehension

**Natural interaction.** Our experts had precise expectations of how the business model framework should be represented in the tool. The experts proposed several improvements for the modeling component, which should allow them to interact more naturally with their business model. One representational aspect was the visualization of value propositions in vertical bars within the framework, and the visual separation of columns in the framework. Expert A stated:

“[What I don’t like is the vertical alignment of the values. I always have to turn my head to read it. You could solve this issue in providing tool tips or in coloring the values. Moreover], the column lines are irritating. I would prefer them to be darker. And the same should be done for separating rows in the framework.”

Expert C had a remark considering the controls for adding new elements (e.g. process activities, resources, expenses, etc.) to the business modeling framework. Actually, he indicated that adding new elements to a business model is realized differently within each of the framework’s areas (value proposition, process, resources, and financials) in the modeling component.

“I don’t understand why there is a button with the label ‘+’ in the column ‘values’. As user, you come to the question, why is there a button like that in the value column, while in the process column there is different kind of button for adding a process step.”

We come to the conclusion that the graphical representation of the framework is still not in line with the expectations of users, which prevents natural interaction with the business model framework. Framework areas should be graphically separated and controls should be standardized. Moreover, natural interaction with the business model also refers to terminology aspects. The language employed within the tool should be aligned with the language of the user. This includes the selection of framework and control icons conveying the semantics of the framework area and controls. Expert D stated:

“External resources are indicated with a shopping cart, right? Well, this would not be my association of a shopping cart.”

In consequence, our icon set has to be revised and tested again for comprehension with other potential users of OctoProz.

**Constant grounding.** In OctoProz, the result of the financial calculation that is specified in the financial analysis component is subsumed in the modeling component at the bottom of the modeling framework in the modeling component. In that way, the user is permanently aware of the profitability of the model. Expert C stated the following:

“I’m confused by the concise representation of the calculation results at the bottom of the framework, which include the distribution fix costs. In the financial analysis component, the
calculation flows very logically, but in the framework I don’t grasp the calculations of the profitability of the model at first sight.”

We deduce that, in general, a concise representation of the current profitability of the business model provides for constant grounding in the modeling process. However, the calculation of the profitability figures should be explained more thoroughly in the modeling component.

5.3 Specialization

Special purpose tool. OctoProz comprises four components with task-specific functionality and features. The functionality is intended to cover a broad range of special purpose tools for business modeling. Expert A stated:

“Your tool doesn’t offer functionality which I would consider as non-sense for business modeling. [...] I like the range of components and features the tool offers. It is a good basis to build upon for future tool improvements.”

We asked our experts to indicate components which they would consider as the most important ones for the task of business modeling. Expert C responded the following:

“There are quite a lot important components and features in your tool. Thus, it is pretty hard to judge which one should be the most important one.”

We conclude that OctoProz provides a comprehensive set of functionality, which is in line with the expectations of our experts. In order to provide for a broad range of functionality, future tool updates should regard all components of OctoProz, rather than focusing on the improvement of single components on the cost of others.

Integration. The integration of functionality was vividly discussed by our experts. We obtained feedback especially for the integration of OctoProz with tools that are employed in the rest of the innovation process, i.e. for business idea development, business casing, and business model implementation. Specifically, the export functionality for financial calculations and their re-use tools for business casing were considered an important feature. Expert A stated:

“It is pretty good that the tool supports export of financial data in MS Excel. Without that functionality you won’t get your business ideas through the controlling department.”

Similarly, Expert B deemed the process model export of OctoProz as important, in order to allow further refinement of the business model.

“It is great that you can re-use the process model as it is and import it into ARIS. You can then start with a detailed process analysis, in accordance with the business goals.”

Overall, the integration of OctoProz with other tools in the innovation process is facilitated by data format compatibility. We deduce that this functionality is appreciated by the experts and should be extended for more complex export formats.

Expert C considered the model syntax check an important feature with respect to the integration of OctoProz and business modeling in the overall innovation process. With the support of the feature, the user could generate syntactically sound models, which are required in the innovation activities downstream the innovation process.

“I want to have my model complete before I hand it over to colleagues. I want to avoid that the first feedback would be that I’ve forgotten something in the model, such as an expense for a resource. The syntax check helps me to develop syntactically sound models.”

We conclude that the syntax check allows for effective re-use of business models, and thus facilitates effective re-use of the business model in the innovation process.
5.4 Collaboration

Our basic premise for the development of OctoProz was to allow for real-time collaboration in business model development. We implemented model rating with five-star voting to allow for quick selection of the best models within the group. Expert D was not convinced that this functionality was needed:

“I suppose that the target user group within an organization is quite small. So, most probably, you will tend to call somebody on the phone to discuss a business model, rather than use the star voting in OctoProz.”

However, Expert B stated that commenting on business models within OctoProz would be one of the most important features of the tool.

“Collaborative development of a business model can’t go without the input of all business modelers.”

From these feature judgments, we conclude that qualitative commenting, either verbally or with written comments, is preferred over quantitative assessment of business models.

Finally, Expert C expected that concurrent editing of one business model would be the exception. While this consideration is in line with Expert D, expecting that teams working on the development of business models within one organization would be rather small, it was a surprise for us, since we expected that a number of approximately four to ten experts would work on one business model, partly concurrently. In consequence, we learned that functionality for real-time collaboration is of minor importance.

We summarize our findings in Table 2, referring to the CSS design properties and the respective OctoProz component or feature.

<table>
<thead>
<tr>
<th>CSS design property</th>
<th>Component / Feature</th>
<th>Findings</th>
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<tbody>
<tr>
<td><strong>Playfulness</strong></td>
<td></td>
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<tr>
<td>Iterative model</td>
<td>Version management</td>
<td>• Model version management is required to allow the business modeler for control over the iterative modeling process</td>
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<tr>
<td>development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business Model</td>
<td>Process Simulation</td>
<td>• Process simulation is required to generate different financial estimation scenarios (e.g. worst-case) for the business model</td>
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<tr>
<td>Simulation</td>
<td></td>
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<tr>
<td><strong>Comprehension</strong></td>
<td></td>
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<tr>
<td>Natural interaction</td>
<td>Modeling component</td>
<td>Natural interaction with the business model should be improved by:</td>
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<tr>
<td></td>
<td></td>
<td>• Clear graphical separation of areas in the business model framework</td>
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<td></td>
<td></td>
<td>• Standardized controls for adding new elements to the model</td>
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<td></td>
<td></td>
<td>• Use of a (symbolic) language familiar to the users (icons)</td>
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<tr>
<td>Constant grounding</td>
<td>Modeling component</td>
<td>• Profitability figures in the modeling component should be self-explanatory</td>
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<tr>
<td><strong>Specialization</strong></td>
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<tr>
<td>Special Purpose Tool</td>
<td>All components and</td>
<td>• OctoProz provides a comprehensive set of functionality for business modeling</td>
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<tr>
<td></td>
<td>features</td>
<td></td>
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<tr>
<td>Integration</td>
<td>Export</td>
<td>Integration of OctoProz with other tools is facilitated though data format compatibility:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Export functionality of financial calculations are required for business casing</td>
</tr>
</tbody>
</table>
### Syntax Check
- The syntax check allows for effective re-use of business models in the innovation process.

### Collaboration
- Model rating, collaborative editing, commenting
- Qualitative commenting, either verbally or with written comments, is preferred over quantitative assessment of business models.
- Collaborative editing of business models is expected to be the exception, so that real-time collaboration functionality is minor importance.

<table>
<thead>
<tr>
<th>Table 2. Summary of the findings</th>
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<tbody>
<tr>
<td>On the basis of our evaluation findings, we draw some key learnings for business modeling tools design and CSS design in general.</td>
</tr>
</tbody>
</table>

### 5.5 Key Learnings

We subsume three key learnings for the design of business modeling tools, and reflect those learnings against the backdrop of the architectural guidelines for GCSS:

- As to our expert feedback, strengths of OctoProz lie in its task-specific support for business modeling. Thus, designers should consider providing for a broad range of functionality specific to business modeling. For the architectural guidelines, we interpret this finding as confirmation of the appropriateness of the recommended components for collaborative idea development.
- Support for the playful interaction with the business model and comprehension of the business model should be improved for OctoProz. We conclude that the importance of GUI design should not be underestimated by tool designers. GUI design of GCSS is considered only marginally in the architectural guidelines for GCSS (Voigt & Bergener 2013), and thus requires further attention.
- The collaboration features of OctoProz over-satisfy the needs in collaborative business modeling. Business modeling tool designers should save effort for complex collaboration functionality, and focus on the formerly mentioned pain-points instead. However, we assume that this finding is not generalizable for GCSS design. Appropriate modes of collaboration (real-time, asynchronous, non-collaborative) might depend on the complexity of the CGP and the creative product. This is an issue which should be addressed in future research.

### 6 LIMITATIONS AND OUTLOOK

Our focus group study in the software development industry is beset with certain limitations which need to be addressed by further research. First, although the tool was evaluated by four method and domain experts, the results are based on a rather small empirical sample. Therefore, the qualitative evaluation needs to be extended by further focus groups and thereby further experts especially from the creative industry. Furthermore, a quantitative evaluation of the tool design corresponding to the CSS design properties is needed for an objective evaluation of the tool OctoProz. Second, as we both tried to generate a common and similar understanding and even as we were restricted by time we decided to present the tool to the experts instead of letting them work with it. Therefore, a further focus group needs to be conducted where participants can find out in detail which features need to be redesigned, which features are relevant and which features are playful. Thus, by underlying use case scenarios the tools strengths and weaknesses could be incrementally identified. Third, as the tool is still implemented as a prototype and, thus, is beset with some control errors, a redesign based on the identified pain-points is needed to enable further (qualitative and/or quantitative) evaluation. Fourth, a general study (evaluation and comparison) of different business modeling tools with regard to the evaluation properties in context of creativity support needs to be conducted. Therewith, the maturity of OctoProz compared to other business modeling tools in respect of the tool design can be pinpointed.
These four major limitations need to be addressed by future research and will support the ongoing process of tool design for OctoProz.

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