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User-center redesign of the Biotechgate portal:
a remote usability testing case study

Diane Golay

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User-center redesign of the Biotechgate portal: a remote usability testing case study

Diane Golay

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Abstract

This thesis is dedicated to the user-centered redesign of the subscriber section of Biotechgate, a global life sciences business development database. The redesign project fits into a global restructuring and redesign process initiated to divide the one current website of the database into a public website and a subscribers-only section in order to improve its global usability.

The objective of the current thesis is to elaborate a new, usability-optimized concept for the core features of the Biotechgate subscriber section in the form of an interactive prototype, applying the principles, methods and best practice of user-centered design.

The design development process is structured into four phases: user needs assessment, requirements definition, prototype development and usability evaluation. Usability evaluation is conducted in the form of remote moderated and automated usability tests with an international panel of Biotechgate (potential) end-users. In addition, the prototyping process is combined with agile (remote) usability testing.

The result of this thesis is an interactive prototype of the core components of the new Biotechgate subscriber section and a set of recommendations for further design optimization.

Keywords: user experience design, user-centered design, usability, redesign, Biotechgate, remote usability testing, user needs assessment, requirements definition, prototyping, agile usability testing

Kurzfassung

Diese Theses befasst sich mit der nutzerzentrierten Neugestaltung der kundenspezifischen Hauptkomponenten von Biotechgate, einer globalen Lebenswissenschaftsdatenbank ausgerichtet auf die Geschäftsentwicklung von Firmen. Das Neugestaltungsprojekt ist Teil eines globalen Neustrukturierungsprozesses, welches eingeleitet wurde, um die aktuelle Datenbank in eine öffentliche Website und eine kundenspezifische Abteilung zu gliedern und dadurch die allgemeine Benutzbarkeit (Usability) der Oberfläche zu verbessern.

Ziel der vorliegenden Theses ist es, ein neues Gestaltungskonzept für die Hauptkomponenten der Kundenabteilung von Biotechgate in der Form eines interaktiven Prototyps zu entwickeln, indem die Richtlinien und die Methodologie des nutzerzentrierten Designs angewendet werden.

Der Konzeptentwicklungsprozess ist in vier Phasen gegliedert: Ermittlung der Nutzerbedürfnisse, Anforderungsbestimmung, Prototypentwicklung und Evaluation der Usability. Die Evaluation der Usability wurde international anhand moderierten und automatisierten Fern-Usabilitytests mit realen (potenziellen) Endnutzern durchgeführt. Außerdem wird der Prototypentwicklungsprozess mit einer agilen Methode zur Durchführung von Usabilitytests kombiniert.

Das Ergebnis dieser Theses ist ein interaktiver Prototyp, welcher die Hauptkomponenten der neuen Kundenabteilung von Biotechgate einbezieht, sowie eine Reihe von Empfehlungen, wie das Konzept weiter verbessert werden kann.

Schlagwörter: nutzerzentriertes Design, Fern-Usabilitytests, Neugestaltung, Nutzerbedürfnisse, Anforderungsbestimmung, Prototypentwicklung

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List of abbreviations

UCD	User-centered design
UX	User experience
UXD	User experience design

1 Introduction

The theme of this bachelor thesis is the user-centered development of a (re)design concept for the subscriber section of the Biotechgate portal. Biotechgate is a global life sciences business development database targeted at the biotechnology, pharmaceutical and medical technology industries, which grants access to more than 30, 000 company profiles and provides extended statistical and financial information on the life sciences industry. It is developed by Venture Valuation, a Swiss company based in Zürich.

The current thesis fits into a global redesign project of the Biotechgate website, initiated by Venture Valuation after the company became aware that the merging of the public and subscribers-only components of the database in one single interface produced confusion among their visitors. In accordance with that finding, it was decided to separate the public website from the subscriber section and a new basic site architecture for both entities was designed, on the basis of which Venture Valuation started developing a new concept for the public Biotechgate website. This thesis will for its part be dedicated to the design of a general concept for the new Biotechgate subscriber section and focus on the optimization of the usability of its core components, namely the main navigation / information architecture, the search masks and the search results display page and company profile display.

This new concept will be elaborated by means of the principles and methodology of user-centered design, whose four fundamental development steps, that is, user needs assessment, requirements definition, prototype development and usability evaluation, will be applied to the case at hand. In compliance with the iterative nature of user-centered methodology, the prototyping phase will be combined with an agile usability testing technique. All usability evaluations with real end-users will be conducted remotely and on an international scale, either in the form of semi-structured interviews (in the user needs assessment phase) or in the form of moderated and / or automated usability tests.

In consideration of the framework of the project and the methodology to be applied to the concept design process, the current thesis has two main goals:

- From a practical point of view, its purpose is to add to what has already been done by Venture Valuation in the field of usability evaluation and to elaborate a new, usability-optimized concept for the core features of its Biotechgate database in the form of an interactive prototype;
- From a methodological standpoint, its objective is to apply the principles, methods and, within the realms of possibility, best practice of user-centered design.

In accordance with the elements mentioned above, the research questions which the current thesis seeks to answer are the following:

- What are the needs and the design-related requirements of the current users of Biotechgate and how, accordingly, can problematic elements be optimized in the new design?
- What best practice is there for the chosen user-centered design methods and in particular remote usability testing, and how can they be applied to the Biotechgate redesign process?

As such, the current thesis constitutes a user-centered design and remote usability testing case study revolving around the redesign of the subscriber section of the Biotechgate database.

The thesis is structured as follows:

Chapter 2 defines the most important terms and concepts around which this thesis revolves, namely User Experience, user-centered design, usability and (remote) usability testing.

The current state of the art and the latest trends in user experience and user-centered design as well as the latest findings on remote usability testing are briefly described in Chapter 3.

Chapter 4 is all about Biotechgate and the current design and main features of its subscriber section.

Chapter 5 describes in detail the goals, methodology, design, tools and results of the user needs assessment phase.

Chapter 6 is dedicated to the definition of the requirements set for the redesign.

Chapter 7 focuses on the prototyping phase of the redesign process. It describes in detail the methodology and tool used to develop the prototype and presents the conceptual design at the root of the new concept as well as the different versions of the prototype resulting from the agile usability tests that were conducted at this stage of the development.

Chapter 8 is dedicated to the final remote usability testing phase. It describes in detail the methodology applied to develop the different test scenarios and the set-up of both moderated and automated tests, and presents the results of the tests and their implications for the redesign concept.

Chapter 9 presents concrete suggestions and recommendations, at times illustrated with a static prototype, for further improvement of the prototype elaborated within the framework of this thesis.

Chapter 10 briefly discusses the validity and usefulness of the results of the current thesis as well as the main issues identified in the methodology applied.

Throughout this thesis, the masculine form is used to refer to both genders.

2 Definitions

2.1 User Experience

In its most literal sense, user experience refers to a “person’s perceptions and responses resulting from the use and / or anticipated use of a product, system or service” (International Organization of Standardization 2010, p. 3), that is, all cognitive, physical, emotional and / or affective sensations or feelings that the use of a specific product or service triggers in those that use it. User experience “is about how people feel about a product and their pleasure and satisfaction when using it, looking at it, holding it, and opening or closing it” (Sharp et al. 2007, p. 15). However, it is not solely limited to the effect the interface has during its being utilized by the user, but also comprises “all the users' emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviors and accomplishments that occur before, during and after use” (International Organization of Standardization 2010, p. 3). User experience does therefore not entirely depends on the way an interface or product is designed, but also on the “user's internal and physical state resulting from prior experiences, attitudes, skills and personality, and the context of use” (International Organization of Standardization 2010, p. 3).

In a broader sense, the term user experience (in this context often abbreviated UX or UXD for *User Experience Design*) refers to a design practice that revolves around “creating [user] experiences – typically digital experiences [...] that are easy to use and satisfying for users” (Nichols and Chesnut 2014, p. 8). As such, the term user experience can refer to two different concepts, or more exactly two different outlooks on a same phenomenon: on the one hand, the concrete sensations, feelings and emotions a user experiences within the context of his using a particular product and, on the other hand, the broader (design) approach that consists in designing for a specific user experience, that is, designing a product in such a way that it triggers specific emotions in the user, behaviors and reactions that are in accordance with, for example, the (business) goals of the product in question (Sharp et al. 2007, p. 15; Nichols and Chesnut 2014, p. 8). To achieve this goal, the design process at the root of the user experience concept is one that “puts the user at the center of all considerations, so that the eventual experience provides interactions that are intuitive, helpful, and even enjoyable” (Nichols and Chesnut 2014, p. 8).

Good UXD must possess a specific set of attributes and qualities, for which the “user experience honeycomb” (shown in figure 2-1) designed by Peter Morville, a renowned information architect, is generally considered as the reference in the field of web design (Barnum 2010, p. 13).



Figure 2-1: The User Experience Honeycomb designed by Peter Morville (Morville 2004)

The “honeycomb” diagram represents the seven different facets of the UX, namely:

- Usefulness, that is, the (optimization of the) suitability of the content, features and appearance of the product in consideration of the needs of its target audience (an attribute that greatly relies on creativity and innovation) (Morville 2004; Nichols and Chesnut 2014, p. 9);
- Usability, generally attached to the degree of easiness with which the main tasks or activities for which the product or system is designed can be successfully performed by its users (Nichols and Chesnut 2014, p. 9);
- Desirability, which refers to the way the product engages the user, for example through an enthralling visual design (Nichols and Chesnut 2014, p. 9);
- “Findability”, with which the author refers to the easy localization of needed information, features and objects within the website (Morville 2004);
- Accessibility, that is, the capacity of the design to be used and understood by people with disabilities as well as by fully capacitated users (Morville 2004);
- Credibility, the degree to which the users trust and believe what they are being told (Morville 2004);
- Value, which refers to the plus-value or the positive impact brought by the user experience to the financial and / or organizational goals of the company, for example through an increase in customer satisfaction and loyalty, or simply through a positive change in the users’ brand impression (Morville 2004).

In practice, the elements or components that, together, create a user experience are the *information architecture* (IA), comprising not only the navigation but also the content

organization and the visual prioritization of page elements; the *content strategy*, which determines the form, the type and the location of the different contents of the site; the *interaction design*, that is, the conception of the interaction rules and characteristics of the user with the interface or system; the *usability*, namely the ease of use of the interface; and the *visual design*, or rather the visual attractiveness, of the site (Nichols and Chesnut 2014, pp. 9-11).

2.2 User-centered design

As mentioned in the previous subchapter, the UXD approach presupposes a design methodology revolving around the specific needs of the (potential) users of the product: this methodology is generally called user-centered design (UCD, sometimes also referred to as human-centered design). UCD is about a decade older than user experience, and was first formally defined by the International Organization of Standardization in 1999 in the ISO standard 13407. However, following the emergence of the UX concept and the paradigm shift it brought about among UCD practitioners, the standard was revised and replaced by the norm ISO 9241-210 in 2010. This updated standard, which aims to provide managers of design projects with “requirements and recommendations for human-centered principles and activities throughout the life-cycle of computer-based interactive system” (International Organization for Standardization 2010, p. 1), has since become the most important standard in the UX field (Travis 2011).

The ISO norm 9241-210 formally defines human-centered design as an “approach to interactive systems development that aims to make systems usable and useful by focusing on the users, their needs and requirements, and by applying human factors / ergonomics, and usability knowledge and techniques” (International Organization of Standardization 2010, p. vi). The UCD philosophy relies on six fundamental principles (International Organization of Standardization 2010, pp. 5-8):

1. Focus on the stakeholders, in particular the (potential) users, of the product and understanding of their needs in consideration of their tasks and environment (context of use);
2. Active involvement and integration of the users throughout the design and the development of the product, either as information providers for the elements mentioned above or as evaluators¹ of the solutions designed;
3. Progressive refinement of the design through regular (usability) evaluation rounds conducted with (potential) end users of the product;

¹ In the current thesis, the term *evaluator* is used to refer to the users participating in the (usability) evaluation of the interface.

4. Because many of the needs, expectations and requirements of the users and other stakeholders are only uncovered in the course of development, during which the designers are able to gain a refined and clearer understanding of the users and their tasks, the basic UCD process must go through several iterations, that is, be repeated as many times as necessary until all requirements identified are fulfilled by the design.
5. Consideration and integration of all factors constituting or contributing to UX in the design (solutions);
6. Inclusion of people with different educational backgrounds, skills and perspectives within the design team in order to stimulate creativity and extend the skill base available.

The basic UCD process is composed of four activities, which can / need to be iterated several times throughout the whole design and development project. The first activity consists in gathering information on the (potential) users of the product and defining its context of use so as to assess the needs of users. Typical user needs assessment methods include interviews, usability evaluations (if the product already exists) and surveys, although there are many more research techniques available. The second activity or phase comprised in the UCD methodology is the specification of the (user) requirements that the product needs to fulfill; it is followed by the production of the design solutions, typically in the form of sketches, wireframes, mock-ups and prototypes, depending on the phase of development. The fourth activity encompasses the evaluation of the design through the end-users, which generally requires a form of usability testing.

2.3 Usability

Usability has been defined in the previous subchapters as the capability of a system to support all the tasks that are needed by the users in order for them to achieve the goal(s) for which they actually use the product, as well as the ease of use of the different features and components necessary to carry out the tasks in question; in other words, the extent to which the product and its functionality are fitted to the specific needs and expectations of its target audience, which is strongly dependent on the context of use (International Organization of Standardization 2010, p. 3; Nichols and Chesnut 2014, p. 13).

This definition can be completed with the so-called five “Es” of usability, developed by Whitney Quesenbery, a well-known usability consultant (Barnum 2010, p. 11). Each “E” stands for a specific dimension of usability; the five dimensions are listed and defined in table 2-1 (Quesenbery 2011):

Dimension	Definition
Effective	How completely and accurately the work or experience is completed or goals reached
Efficient	How quickly this work can be completed
Engaging	How well the interface draws the user into the interaction and how pleasant and satisfying it is to use
Error tolerant	How well the product prevents errors and can help the user recover from mistakes that do occur
Easy to learn	How well the product supports both the initial orientation and continued learning throughout the complete lifetime of use

Table 2-1: The five dimensions, the so-called five "Es", of usability, defined by Whitney Quesenbery (Quesenbery 2011)

These five aspects of usability can be considered as a practical definition of usability and constitute a helpful tool for the design and the evaluation of usable interfaces.

2.4 (Remote) Usability Testing

The term *usability testing* refers to “the activity that focuses on observing users working with a product, performing tasks that are real and meaningful to them” (Barnum 2010, p. 13) in order to evaluate the usability of the product in question. Basically, the purpose of usability testing is to identify problems in the functionality, structure and / or appearance of an interface.

Usability tests can be described as “structured interviews focused on specific features of an interface [...]” (Goodman et al. 2012, p. 11) which revolves around a series of tasks to be performed by an *evaluator*, in general either a current or potential end-user of the product to be evaluated or simply a member of the product’s target audience, while a *moderator* (sometimes supported by passive observers) watches the evaluator’s activities and keeps track of his hesitations, questions, reactions, remarks, mistakes and successes. Evaluators are normally asked to think aloud while they are performing the set tasks, so as to make it easier for the moderator and observers to better understand his overall experience with the interface (Goodman et al. 2012, p. 377). Traditionally, usability tests are conducted in specially equipped laboratories; however, in recent years, many usability experts and practitioners have advocated that valid usability tests could be conducted with no or only minimal equipment (Barnum 2010, pp. 37-38; Bolt and Tulathimutte 2011, p. 3).

The observations, results and feedback from all usability tests conducted are brought together at the end of the testing phase and analyzed by the developers, who then collect

“the most common issues into a list of functionality and presentation problems” and check if the solutions they designed effectively fit the users’ needs and expectations (Goodman et al. 2012, p. 273).

Depending on their goals, their scope and / or the stage of development at which they take place, usability tests can be divided into different categories or types. A first differentiation can be made between formative and summative testing. Formative usability tests take place throughout the development of the product and aim to uncover issues, establish diagnostics and fix problems. Summative tests, however, are meant to ensure that the product effectively meets all requirements set after the product is finished, through metrics of users’ success/failure (Barnum 2010, p. 14). Goodman et al. (2012, p. 274) suggest a more precise typology and differentiate between four kinds of usability tests: exploratory, assessment, comparison and validation. However, exploratory and assessment testing can be associated with formative usability testing, as they are both supposed to take place during the development process and pursue similar goals, while validation tests are equivalent to summative tests. As such, the inclusion of comparison usability testing, consisting in the parallel evaluation of two different designs to determine which one better fits the needs and expectations of the users, is the single essential difference between both categorizations of usability tests.

Remote usability testing is in principle and in methodology globally similar to traditional usability testing, with the difference that the evaluator and the moderator are separated in space and / or in time (Schade 2013; Andreasen et al. 2007, p. 1406). As such, remote testing enables researchers to reach and test users regardless of their location. It is particularly beneficial for projects with limited financial and time resources and for testing products whose users are geographically dispersed (Schade 2013). Of course, it is also advantageous for the evaluators themselves, for they do not need to travel and can do the test from their own office or home (Schade 2013). There are two types of remote usability testing methods: moderated (or synchronous) and automated² (or asynchronous) testing.

In the moderated testing mode, the evaluator is spatially but not temporally separated from the moderator, which makes it possible for evaluator and moderator to communicate with each other synchronously by means of telephone, chat, instant messaging or / and a voice-over-IP service (such as Skype) (Schade 2013; Andreasen et al. 2007, p. 1405). Simultaneously, the facilitator can watch the user interact with the interface in real time, typically through screen-sharing (Schade 2013; Andreasen et al. 2007, p. 1406). Since the evaluator can communicate directly with the moderator, the think-aloud protocol can in general be applied to remote synchronous tests like in traditional usability tests. Moderated

² Automated remote usability tests are sometimes also referred to as «unmoderated» remote testing (Schade 2013).

remote testing is thus not a new method, but simply a means to conduct traditional testing remotely through the use of newer technologies (Greifeneder 2011, p. 83).

With remote asynchronous testing, on the other hand, evaluator and “moderator”, in this case rather a researcher or usability expert, are separated both spatially and in time, which means that the user completes the test on his own schedule, typically by using an online tool that guides him through the different tasks of the test and automatically records his interactions with the interface, which the expert can later access and analyze (Schade 2013; Andreasen et al. 2007, p. 1406; Bolt and Tulathimutte 2011, p. 37). The main difference with remote synchronous testing is that the evaluators receive no direct support from the test designer(s) and that the researcher can only see and analyze the performance of the test participants after they have completed the tests.

It must be pointed out that moderated and automated tests produce different kinds of data: moderated research is above all qualitative, while automated research is nearly always quantitative. As such, the choice between synchronous and asynchronous remote testing depends mainly on the goals of the study (moderated testing is typically better for a formative study, while automated tests are more suited to a summative evaluation) as well as on the nature of the product (complex vs. simple interface, for example) (Bolt and Tulathimutte 2011, pp. 39-40).

3 State of the Art

Arisen about fifteen years ago (Macdonald and Atwood 2013, p. 1972), the UX paradigm is today firmly established as design philosophy and methodology, not only for Web-based products but also for software and devices (subdomains of UX such as e.g. interaction design apply the UX guidelines to a vast variety of products, not limited to Web interfaces, as shown by Sharp et al. 2007). The UX-favorable update of ISO standard 13407 through ISO 9241-210 is a definitive proof of the design-related paradigm shift from a focus set purely usable interfaces to the integration / consideration of more global factors such as user affect and context of use in the design process (Macdonald and Atwood 2013, p. 1972).

The popularity of UX and UCD is also visible in the proliferation of handbooks, papers and case studies revolving around the practical application of the UCD principles and methods. The idea of using UCD in a redesign process is not new and has been successfully put into practice for various types of Web-applications, such as digital libraries (Long et al. 2005, S. 324) and library websites (Ward 2006, S. 207; Becker and Yannotta 2013), although in general not in combination with remote usability testing but with the “traditional” usability testing methods.

Usability testing, the most common interface evaluation method and therefore unanimously considered as the cornerstone of UCD and by extension UXD, has been extensively and thoroughly studied and discussed in the literature during the last twenty years. Consequently, a very large collection of handbooks, papers and blog articles are available on the subject, covering all aspects of usability testing from the number of evaluators required to obtain valid and complete results, methodology and test design (structure, duration, task creation and wording etc.) to the analysis and the presentation of the test results. In all those aspects, the research and work of Jakob Nielsen is commonly cited as reference.

The latest development in the field of usability testing seems to be a shift from *iterative* to *agile* testing, as a significant amount of the recent (from 2005 onwards) UX-specific literature addresses that topic (this tendency is also visible in the Web magazine UXmatters³, an information and discussion platform for all UX practitioners). More specifically, current discussions and experiments revolve around how UCD can be combined with agile (software) design processes so as to achieve the best possible result with the least (time and financial) resources in all phases of UCD (McGinn and Ramirez Chang 2013; Six 2011; Sengupta 2014).

As for remote usability testing in particular, it has been put to the test by many authors, and there is a large collection of articles about the subject. However, most papers address the topic very specifically and from an empirical standpoint, dealing with its different strengths

³ <http://www.uxmatters.com/index.php>

and weaknesses (Schade 2013; Madathil and Greenstein 2011), or comparing it to other remote or “traditional” usability testing methods (Andreasen et al. 2007; Lizano and Stage 2014; Bruun et al. 2009). It is now accepted that that remote moderated testing using the think-aloud protocol is as efficient in uncovering usability issues as traditional, lab-based (think-aloud) usability testing, whereas remote automated testing is significantly less productive in terms of identification of usability problems, but has the advantage of being less time-consuming and able to be conducted with much larger numbers of evaluators (Bruun et al. 2009; Barnum 2010, pp. 44–45). Within the field of remote usability testing, the book *Remote Research* by Bolt and Tulathimutte (2011) is commonly cited as reference.

4 Presentation of the Biotechgate portal

4.1 What is Biotechgate?

Biotechgate⁴ is a global life sciences and business development database for the biotechnology (biotech), pharmaceutical (pharma) and medical technology (medtech) industries. It is mainly aimed at business development executives, investors, consultants and scientists from all around the world that seek to find partners and / or customers within the life sciences industry (Venture Valuation 2014b). Biotechgate is owned and developed by Venture Valuation, a Swiss company whose primary field of activity is the assessment and valuation of companies, products and patents within the life sciences industry (Venture Valuation 2014a).

The Biotechgate global database is composed of three different databases: a company database, currently comprising more than 31'000 life sciences company profiles; a licensing deals database, providing financial information on therapeutic deals from the year 1996 onwards; and an investor platform (added in 2014), giving scientists and entrepreneurs in the process of raising capital access to present and future-looking investor data. However, the company database constitutes the core of Biotechgate. Apart from general company details, a company profile can contain extensive information on products and technologies in different phases of development as well as financial company information such as financing rounds and company valuations, details on finalized licensing deals (for products and technologies) and details on the people involved in the management of the company.

In addition to the databases mentioned above, Biotechgate also provides its users with information on news, jobs and events within the life sciences industry, and publishes statistical reports on the latest financial activities and trends in the industry.

4.2 Origin and context of the redesign project

Since its inception in 2003 (Hirano 2012), Biotechgate has gradually grown in complexity by integrating new databases, features and services. Despite this significant growth, the public website, that is, the part of Biotechgate which is accessible to non-subscribers, has always been merged with the subscriber section of the database, composed of pages and features that are fully accessible and usable only by logged-in users. Such pages include, among others, the search masks, the display of the results overview as well as of the company profile and its different information sections – including all the features specific to those components.

⁴ <http://biotechgate.com/gate/v3/companies.php>

Through user feedback, Venture Valuation became aware that this set-up was confusing to their visitors, who had difficulty finding their way within the website and struggled to find the information they needed. On the basis of this finding, the decision was taken to separate the public website from the subscriber section, and the company started working on a new concept for each of those two sections of the website.

This separation implied major changes in the information architecture and the content strategy / organization of the existing website, and Venture Valuation decided to use this opportunity to redesign and optimize the public Biotechgate website. Recurrent problems encountered by users had led them to identify significant usability issues in the functionality of the core components and features of the database (search masks, results display, profile view), and the company felt that these issues needed to be addressed in a redesign, or rather a design optimization, of the elements inherent in the subscriber section as well.

The current thesis situates itself within this broader restructuring and redesign project as well as the will of Venture Valuation both to create a concept that meets the needs of the Biotechgate users for the new, independent subscriber section, and to optimize the usability of its core components, which are actually not directly affected by the restructuring itself. Since the project around which this thesis revolves is interlocked with the redesign of the public website, conducted by Venture Valuation, the thesis will draw on the groundwork established by the company at the beginning of the global restructuring project: the known or suspected usability issues will be further investigated and added to and the information architecture will be structured using the site maps of the new public website and the new subscriber section provided by the company.

4.3 Core components and features of the Biotechgate subscriber section

4.3.1 *General layout and start page*

Figure 4-1 shows the start page of the Biotechgate subscriber section as users see it after logging in into the database.

Figure 4-1: Screenshot of the start page of the subscriber section as the users find it after logging in.

The basic layout of the Biotechgate website is composed of a header, a horizontal, drop-down main navigation, two sidebars on either side of the page, as well as a footer (see figure 4-3). These components are common to all pages of the website.

In addition to the company logo and the customary “Log off” button, the header contains a free search text field, from which users can initiate a search in the company database. The left sidebar gives subscribers access to the search masks available for each database. Biotechgate provides different search masks for the company database, making it possible for their users to search the company profiles contained within the database not only by general company-related criteria, but also by products, technologies, financing rounds, company valuations, management details and licensing opportunities. By clicking on the name of a database, users can also get to an information page about the database in question.

The right sidebar can be described as a user’s “toolbar”, composed of several “boxes”, each dedicated to specific user-related features or to information aimed at users. The first box in the sidebar, labelled “User Navigation”, allows subscribers to manage their account parameters, including their saved bookmarks and personal notes. Links to the terms of use and privacy policy of Biotechgate are also provided. Users’ saved searches are accessible from a box further down the sidebar. Biotechgate partners, that is, the members of the

companies that are listed in the company database, have a box of their own, amongst other things giving them access to their company profile's statistics. The three last boxes available give an overview over the next life science events taking place, the latest updates conducted in the database as well as the latest industry news published.

The main content is displayed in the center of each page. The start page of the subscriber section contains links to the information pages of the databases already mentioned above, and to the "Edit profile" page. It also gives an overview over the user's subscription parameters and provides information on the use of the Biotechgate database (see figure 4-2). However, the latter is only visible after scrolling down on the page.

Information about the use of the Biotechgate Database

The database subscription provides you with more comprehensive search features as well as with full access to the information of all available company profiles. You are also able to bookmark any profile for easy reference in the future.

Following is an explanation of the symbols which may appear on the search results page:






-  Click on this icon to print the complete company profile. If you want to print only some sections of a profile (e.g. products), use the links "print this page" in the corresponding profile area.
-  Click on this icon to download a pdf-file of the complete company profile.
-  Click on this symbol to search for competitors and organizations which are active in a similar field.
-  Click on this symbol to bookmark the corresponding company profile (bookmarked profiles can be found by clicking "Bookmarks" in the main navigation). A green or blue background behind the bookmark icon means the corresponding item has already been bookmarked.
-  Click on this symbol to remove an item from your bookmark list (this feature is available on your bookmark page only).

Figure 4-2: Screenshot of the information provided by Biotechgate on the use of the database (extract)

The footer (see figure 4-3) gives a tree-like overview over the contents of the main navigation, which means that all options available in the main navigation are displayed as links. In addition, links to the different social media profiles of Biotechgate are provided.

Database Companies Products Technologies Financing Rounds Management Licensing opportunities Licensing deals	Subscriptions Companies Deals Get a trial	About Biotechgate Companies Licensing deals FAQ Statistics Partners Info page	Resource center	News	Events Add event	Job Market	Contacts Add a company Follow Follow Folgen
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Figure 4-3: Footer of the Biotechgate website

4.3.2 Search masks

As mentioned in the previous subchapter, different search masks are available to search through the company database of Biotechgate, which makes it possible for subscribers to search through and by all information sections (general company information, products, technologies, management, financing and deals) of the company profiles contained within the database. As such, the following search masks are available: *Companies*, *Products*, *Technologies*, *Financing rounds*, *Company valuations*, *Management details* and *Licensing opportunities* (which has two forms: either products or technologies).

All search masks have a similar appearance and design, although they all have specificities, such as specific filter menus. However, there are considerable overlaps between the different search masks, for certain filters can be applied to different elements (both to products and to technologies, for example).

Typically, a search mask contains a free text search field, basic search filters that are displayed by default, and advanced filters that the users can open and close at will. This structure is visible in figure 4-4, the general Companies search mask being taken as example.

Figure 4-4: *Companies* search mask

The *Companies* search mask is the most complex mask in the database and the one that offers the most filter options. However, only the most basic filters are visible at first sight (as shown in figure 4-4); it takes additional clicks (on the grey expandable bars) to get to the more advanced filters. Some filter menus, such as *State* or *Subsector*, are only active if an option has been selected within the filter menu they depend on (*Country* for *State* and *Main sector* for *Subsector*).

The *Licensing opportunities* search mask is the only mask that comes in two different forms: products and technologies. The masks are accessible through tabs located at the very top of the page (see figure 4-6). In both cases, the search masks are almost identical with the “parent” (respectively the *Products* or the *Technologies* search mask), with the difference that the option “available for out-licensing” is checked by default.

Home / [Licensing Opportunities](#)

Products Technologies

Search within **Medicon Valley** only

Continent / Region

Search in bookmarks Country

Available for out-licensing

Technology area

Figure 4-5: Top of the *Licensing opportunities* search mask

4.3.3 Results display page

Figure 4-6 shows the components and the layout of the results display page, which is composed of two sections: the top of the page contains information on the search conducted and the number of results found, and provides users with features to manage the search, the results and the results display; while the remainder of the page encompasses the listing of the search results in the form of “extracts” from the profile view. The kind of information that is displayed in the results list depends on the search mask used to conduct the search. As such, a search with the *Companies* search mask will create a listing of companies with general company information, while a search with, for example, the *Products* search mask will create a listing of products with product-related information, that is, information from the *Products* information section of the company profile.

The screenshot shows a search results page for 'COMPANY'. At the top, there are navigation links: 'Refine search', 'New search', and 'Save search'. Below this is an 'OVERVIEW' section with a 'Download results in Excel format' button. The results are displayed as 'Results 1 - 20 out of 157 displayed.' with a pagination bar showing numbers 1 through 7 and a 'Next' link. A 'Search filter' section lists 'Country: Switzerland' and 'State/province: VD'. The main entry is for 'Abionic SA' from 'Lausanne, Switzerland', with social media icons (G, P, F, M, N) and a star icon. The entry details include:

- Main sector:** Medical Technology
- Subsector:** Other, Diagnostic devices
- Products:** In development: 2
- Descriptions:** Abionic SA is a medical technology company focused on the development of in vitro diagnostic devices for allergies detection. The company's products includes abioKIT and abioSCOPE.

 At the bottom, there are navigation links: 'Company | Products | Financing | Management | Notes'.

Figure 4-6: Results display page (extract including one single entry)

Once on the results display page, users see the number of results their search has produced and which search filters are active. They have the option of going back to the search mask, either to refine their search or to start a new search. They can also save the search they have just conducted, in which case it will be accessible from the right sidebar, as shown in figure 4-7. From here, they are able to create an e-mail alert for this specific search, so as to be warned when new companies (in this particular example) that match the search criteria are added to the database.

The screenshot shows a 'Saved Searches' box. It has a green header with the text 'Saved Searches'. Below the header, it says 'You have 1 saved searches. Click on a link to load a saved search.' There is a horizontal dotted line below this text. Under the dotted line, it says 'Companies in VD'. At the bottom of the box, there are five icons: a trash can, a document with a checkmark, a folder, a person, and an information icon.

Figure 4-7: "Saved Searches" box in the right sidebar

Users can also manage the display of the results by selecting a specific ordering criterion and / or sort direction and they have the possibility of downloading all results in Excel format.



Figure 4-8: Entry-specific features in the results list (from top left to bottom right): completeness indicators, bookmark, print and download as PDF

The results list provides them with entry-specific features (see figure 4-8). As such, they can bookmark, print and / or download as PDF the whole company profile corresponding to each entry of the list by clicking on the corresponding symbol in the entry header. In addition, the header comprises so-called completeness indicators, which indicate what information sections are available within the company profile. The legend of the completeness indicators, that is, what each letter stands for, is displayed at the bottom of the page (figure 4-9). By clicking on the completeness indicators, users can access the corresponding information section (triggering the opening of the company profile). They can also access the different information sections by clicking on the links provided at the bottom of the entry (see figure 5-6), or open the information section corresponding to their search by clicking on the header of the entry.

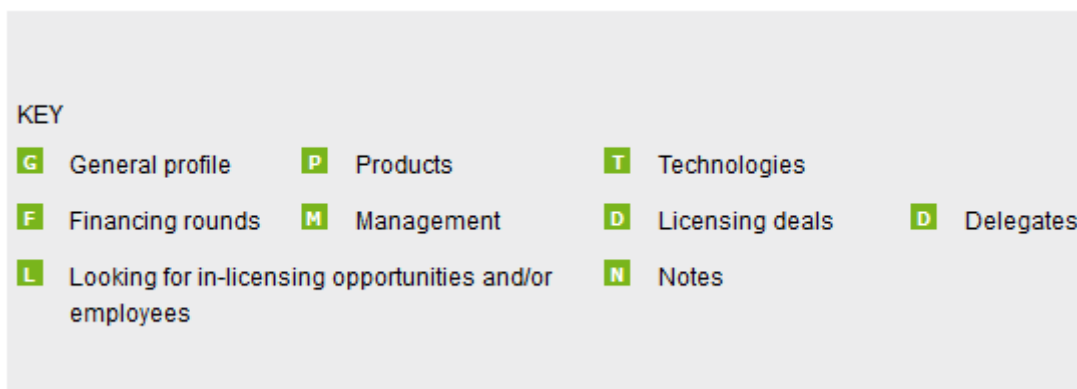


Figure 4-9: Legend of the completeness indicators

4.3.4 Profile view

The company profile of an entry opens in a pop-up window, as shown in figure 4-10. Despite differences in the contents, all information sections have a similar structure and design. Users can navigate between the different information sections available by means of the tabs located at the top of the page. They can also choose to have the full profile displayed on one single page (by clicking on the corresponding link / button underneath the tabs on the right), and / or print the profile. The completeness indicators are also visible in the profile view, but

indicate in which information section the user currently is instead of what information sections are available.

The screenshot shows a web browser window titled "Abionic SA - Company Database - Mozilla Firefox". The address bar contains the URL: [www.biotechgate.com/gate/db/detail.php?c=20279551k\\$SnwIOwymBheWs](http://www.biotechgate.com/gate/db/detail.php?c=20279551k$SnwIOwymBheWs). The page features a navigation bar with tabs for "Company", "Products (2)", "Financing (1)", and "Management (7)". Below the navigation bar, there are links for "[full profile]", "[print]", and "[close]".

The main content area is titled "ABIONIC SA" and includes the following information:

- BIOTECHGATE BY VENTURE VALUATION**
- Latest up-date: 13 Dec 2013
- DOWNLOADED BY: Diane Golay

The "GENERAL INFORMATION" section includes a star icon and a "G P T F M D" filter. The information is presented in a table-like format:

EPFL Innovation Park, Building B 1015 Lausanne Switzerland, VD		Founded (year)	2010
Contact person	Dr. Nicolas Durand, Founder and Chief Executive Officer	Source of foundation	Spin-off from public institution / NPO
Company main phone	+41 (21) 693 82 50	Name of foundation source	EPFL (Swiss Federal Institute of Technology Lausanne, Switzerland)
Company main fax	+41 (21) 693 82 52		
Company e-mail	info@abionic.com		
Website	www.abionic.com/		

The "Corporate description / mission" section states: "Abionic SA is a medical technology company focused on the development of in vitro diagnostic devices for allergies detection. The company's products includes abioKIT and abioSCOPE."

Additional information includes:

- State of ownership:** Private / independent
- Headquarters:** Yes

The "CATEGORIZATION" section at the bottom includes a "G P T F M D" filter.

Figure 4-10: Profile view of a company (general company information section)

In addition, users also have the possibility to bookmark a whole company profile or single items (depending on the information section in which they are: specific products, technologies, persons, etc.) from the profile.

5 User needs assessment

5.1 Goals and Research Questions

In accordance with the thesis assignment and purpose described in the previous chapters, the user needs assessment phase must result in an in-depth analysis of how the Biotechgate interface is experienced by its end-users, which could be turned into an estimate of what components, features and functions must be optimized within the redesign process (redesign requirements). In addition, the research results should provide insights as to how the usability issues pointed out by the users could be solved.

As such, the research goals were the following:

- Understanding the users' needs and expectations concerning the core Biotechgate components and features under focus;
- Uncovering usability problems in the considered core features of Biotechgate;
- Gathering qualitative input from the users as to how the identified problems could be solved.

To reach those goals, several user-centered questions had to be answered, namely:

- What features of the core elements of Biotechgate under focus do the users actually use within the framework of their current work assignments?
- What problems do the users encounter while using those features? How could those problems be solved, respectively how could the feature be improved so as to better suit users' current needs?
- Are there features that are currently missing and which users feel would be useful for carrying out their current work assignments in the database? If so, what are they?
- Are there features that the users do not need / use to carry out their current work assignments within the database? If so, what are they and how could they possibly be improved so as to better fit users' current needs?
- What features of the core Biotechgate elements under focus perfectly meet users' current needs and hence must not be modified in the new concept?

The last question was an essential one, since modifying the functions the end-users were satisfied with could lead to new usability issues and hence be counterproductive for users as well as for the redesign project as a whole. Furthermore, knowing what the users were familiar with and felt should not be changed would allow establishing "boundaries" for the redesign.

5.2 Methodology Overview

User research data were gathered through remote semi-structured interviews with end-users of Biotechgate. This method was preferred over other data-collecting techniques typically used within the framework of user needs assessment, such as focus groups, user surveys or log files analysis (Sharp et al. 2007, pp. 292-348), mainly because of the qualitative nature of the data needed as well as the method's suitability for remote execution. Furthermore, a semi-structured approach made it possible to directly ask users about their use and opinion on specific components and features, as well as give them the opportunity of addressing issues and functions not explicitly mentioned by the interviewer. That way, the data on the usability problems already uncovered by Venture Valuation could not only be further clarified, but also added to with new data on features possibly not yet considered.

As none of the users were familiar with the planned main navigation of the new subscriber section of Biotechgate, the usability of this component could not be satisfactorily evaluated with the traditional semi-structured interview technique alone. Therefore, a three-task tree testing activity was developed, within the framework of which the users could, on the one hand, answer the questions asked explicitly and, on the other hand, give implicit feedback on the usability of the main navigation by completing, successfully or not, the three tasks prepared.

The interview was designed to produce input from users on all four core Biotechgate components under investigation, namely the search masks, the results display page, the profile view with the different information sections of the company profile, as well as the main navigation. Each user was asked to talk only about the search mask(s) and profile(s) they currently used to carry out their work assignments. Although it was clear that such a procedure would cover only a few of the search masks and features available in Biotechgate, the idea was to allow the identification of more general usability issues, common across several database components. As elements common to all users, it was expected for all relevant features or characteristics of the results display page and the main navigation to be analyzed more in-depth.

A best practice research was conducted in order to structure and formulate the questions and conduct the interviews. Before and during the execution of the interviews, both the guidelines of Goodman et al. (2012, pp. 135-136) and the table of question types for interviews of Hackos and Redish (1998, p. 280) was used as work tools for guidance and support. As the interviews were semi-structured, having these principles and sample questions at hand played a significant role in the appropriate formulation of improvised, user-specific questions.

5.3 Recruiting

No requirements relating to the profile of users to be recruited were set for the interviews, the only condition being for the interviewees to be current Biotechgate users. However, a minimum of four interviewees was required.

Four interview candidates were originally contacted and recruited by the co-founder of the Biotechgate database (and contact person at Venture Valuation throughout the project), who upon confirming their willingness to participate in the study transmitted their contact details to the interviewer. The interviews were then individually scheduled by the interviewer about two weeks in advance of their taking place. All exchanges were conducted per e-mail. All interviews were scheduled to take place within a one and half week period. However, due to technical difficulties and scheduling conflicts, the user needs assessment phase had to be extended by two more weeks, bringing this initial phase to a total duration of three and a half weeks.

5.4 Interview design and contents

In accordance with the focus of the current thesis, the main navigation, the search masks, the results display and the profile view of the (new) subscriber section constituted the core of the interview. In addition, all usability-related points or questions raised / required by Venture Valuation were integrated into the interview, the most notable example being an enquiry question on the necessity of developing a mobile version of the Biotechgate website.

Following the guidelines of Goodman et al. (2012, pp. 129-130) on the different phases of user experience interviews, the interview was divided into the six following phases: *introduction*, in which the redesign project and the goals of the interview were presented, *warm-up*, consisting in a few questions about the interviewee's profile and background, *general issues*, revolving around general Biotechgate-related comments, *deep focus*, the "core" of the interview and dedicated to the individual analysis of each component under focus, *retrospective*, comprising a few general complementary questions on the database, and *wrap-up*, this last part being essentially dedicated to thanking and saying goodbye. The questions were developed according to the six principles of non-directed interviewing presented by Goodman et al. (2012, pp. 132-134). As such, it was attempted to keep all questions focused on the personal experience of the interviewees within the framework of their current work environment and assignments. All words or expressions that could come across as judgmental were removed in order to guarantee the neutrality of the interviewer. Furthermore, binary questions were reformulated into more open-ended questions and broad, unfocused questions were broken down into several ones, each dedicated to one simple topic or element. In addition, following the guidelines of Sharp et al. (2007, p. 304), all

user experience and usability-specific terms were removed from the questions and replaced with more current expressions or paraphrases.

Throughout the so-called “deep focus” phase, that is, the part of the interview focused on an individual assessment of each core feature, a key element to guaranteeing the success of the interview and the qualitative nature of the data was the ability to see users’ screens as they navigate through the different Biotechgate components and features. It was felt that important implicit qualitative information could be lost and the communication between interviewer and interviewee made difficult without it. As a consequence, the choice of an appropriate remote communication tool was as important for the success of the interviews as its design and contents.

The interview was built to last about 70 minutes; 10 minutes were dedicated to each core component (search masks, results display page, company profile and main navigation) under focus.

5.5 Tools

Three tools were used for the interviews: Skype⁵ for communicating and screen-sharing, Treejack⁶, an online software developed by OptimalWorkshop⁷, for tree testing and Evaer⁸ for recording the interview.

Skype is a widely used, multifunctional remote communication tool that, among other features, enables its users to video call other online Skype members, to share one’s screen with them as well as to converse with them through instant messaging, for free. All interviewers were expected to have a Skype account prior to the interview, since it is such a popular tool for business as well as private long-distance calls.

Treejack is only one of many available online tree testing tools, but has the advantage of offering a so-called “free plan” that allows small tree testing studies of up to three tasks to be tested by up to ten people for free. It is very easy to use and the results of the study can be downloaded in Excel, which makes analysis of the data easier. Despite the limitations of the free plan, Treejack suited the needs of the interview.

Evaer is a software specifically designed to record audio and video Skype calls, including screen-sharing sessions. Both the elements to be recorded (local or remote webcam only, side-by-side recording of both webcams etc.) and the way calls are saved are customizable (one file for all calls or separate files for each caller, file format etc.). If the screen-sharing function is activated, the screen being shared is recorded in addition to the local and remote

⁵ <http://www.skype.com/en/>

⁶ <http://www.optimalworkshop.com/treejack.htm>

⁷ <http://www.optimalworkshop.com/>

⁸ <http://www.evaer.com/>

webcam video feeds. The only downside of Evaer is that it is not free, and that the trial version is limited to five-minute recordings. The licensed version currently costs \$ 19.95.

5.6 Results

5.6.1 Interviewee profiles and scope of the results

Of the four interviews scheduled, only three could actually be carried out, as one candidate did not appear. One of the interviews had to be postponed due to technical issues, and took place one and a half weeks later than originally planned. During the first two interviews, the pre-set seventy-minute time limitation was respected. However, since the third and last interviewee was able to give a more in-depth analysis of the interface and was willing to take the time necessary to address all relevant issues, the time limitation was ignored. As a consequence, this third interview produced significantly more data than the two previous ones.

The three user profiles of the interview participants are shown in table 5-1. The gathered data covered, in addition to the results display page and the main navigation, which were common to all interviewees, two of the eight search masks and two of the six profile-specific information sections (see chapter 5.3.2 for a more detailed description of the different search masks and profiles available in Biotechgate). The search masks on which data were collected were “companies” and “licensing opportunities”; the specifically addressed profiles were “companies” (aka “general profile”) and “products”.

	User 1	User 2	User 3
Sex	female		
Age	35-40	25-30	35-40
Biotechgate user since	April 2014	October 2013	October 2008
Field of expertise	Life sciences	Life sciences, business administration	Knowledge management
Job title	Business Development Manager	Analyst, Strategic Initiatives	Head of knowledge management
Country	Sweden	Canada	Spain
Work assignments	<ul style="list-style-type: none"> • Get companies to settle in the region • Attract capital investments in companies of the region • Export deals 	Support and promote small medtech companies in the region (partner companies)	<ul style="list-style-type: none"> • Support and promote companies in the region • Add company entries to the database • Search and deliver information for colleagues and partners • Provide user support

Table 5-1: User profiles of the three Biotechgate users having participated in the interviews.

5.6.2 General issues and impressions

All interviewees declared they were generally happy with the design and the contents of Biotechgate. The shortcuts to the search masks in the left sidebar and the different search masks available are particularly appreciated, although one participant mentioned that the separation between search masks could be improved. However, at some point during the interview all three users pointed to the lack of information available regarding the different features of Biotechgate, such as the Biotech Financing Summary and the Life Sciences reports, as well as on the search-related features of the database, such as the bookmark, notes or save search functions. One interviewee suggested that a short demo video be made available on the site so as to make it possible for new users to get a quick and global overview over the different contents accessible in Biotechgate.

5.6.3 Main navigation

Several problems were uncovered in the main navigation. Users were confused by the menu option "Resource Center" for it was unclear what kind of information or documents such a center could comprise. One interviewee suggested that the category be renamed into "Reports", since it is the platform from which life sciences reports can be downloaded.

The participants also encountered difficulties while trying to locate the database statistics pages (“Companies per sector” and “Companies per country”), expecting them to be located either under the “database” menu (actually comprising links to the different search masks) or in the “Contact & Support” category.

A further issue is the absence in the main navigation of the “Definitions” sheet, which is only accessible through the “FAQ” menu option (see chapter 6.6.4.3).

5.6.4 Search masks

5.6.4.1 General issues and remarks

All users used the “Search within Medicon Valley only” checkbox, suggesting that the location of this filter should not be modified in the redesign.

5.6.4.2 „Licensing opportunities“ search mask

The main issue identified within this particular search mask was the lack of visibility of the “link” or “dependence” of certain filter menus with others: the interviewee had overlooked the “activation” of the “Therapeutic sub-sector” after selecting an option within the “Main area / sector” list box during previous visits and noticed it for the first time during the interview. Another source of confusion was the unavailability of the “Phase” filter menu, and the participant in question needed to experiment for a few instants with the other available filters before figuring out that the selection of a product type triggers the activation of this particular sub-filter.

5.6.4.3 „Companies“ search mask

The two participants who chose to discuss the “Companies” search masks both mentioned that the “localization” of a specific company sub-sector within the main sectors available / suggested was problematic. One interviewee suggested that a small text search field be added to the mask in order to render the sub-sectors “searchable” and thus make it possible for users unfamiliar with the company categorization criteria used by Biotechgate to find a particular sub-sector without needing to go through the whole “Main sector” list in order to see what sub-sectors are comprised in each main sector. Furthermore, the same user criticized the lack of accessibility of the so-called “Definitions” sheet, which contains the definitions of all sectors and sub-sectors: the page is to be found under the FAQ category, and does not appear in the main navigation.

One of the users suggested for a short demo video to be made on the advanced search options available within the “companies” search mask, since those advanced filters are more seldom used than the basic filter options.

5.6.5 Results display page

Users were overall satisfied with the layout and the contents of the page, as well as with the features available. All participants mentioned using the “Download in Excel format” feature, along with the “Refine search”, “New search” and “Save search” functions, which they all described as excellent. However, one participant lamented the lack of indication / information as to what elements, or rather fields, actually get downloaded in the Excel sheet. Furthermore, the same interviewee expressed the wish to be able to download the results list not only in Excel format, but also as PDF. In addition, she mentioned that the space used by the elements and features located at the top of the page (above the listing of the search results) could be optimized: the vertical display of the active search filters takes up too much space. She suggested for the active filters to be displayed horizontally instead of vertically and for them to be “linked” to one another with Boolean connectors, in order to help the user to better understand exactly what search query had been conducted in the database.

Two further, less important issues were identified in the top half of the results display page: first, the impossibility of having all search results displayed on one single page, and second, the rather “unintuitive” use of the “Order by” and “Sort direction” functions, which have to be defined separately.

However, the most significant issue uncovered within the page was the inability for users to understand the role and the meaning of the so-called “completeness indicators” located in the header of each entries in the results list. Only one participant found them useful and indicated that the information they conveyed was valuable, for they made it possible to quickly assess what company profiles contained the type of information sought. Another user expressed confusion at seeing the same information in two different locations – in the header in the form of the completeness indicators and at the bottom of each entry as text links, and suggested for the information to be accessible in one single location, either at the top or at the bottom.

Other problems mentioned were the lack of visibility of the bookmark feature – two of the three interviewees were unaware of this one function – as well as a dysfunction (or at least an issue perceived as such by the user) in the print function, which leads to the company profile being printed without the correct layout, making the information comprised within the profile less readable. Additionally, the user who previously noticed the bookmark feature criticized the lack of information on the functionality of the function in question. Furthermore, at least one participant did not see / understand that the “Download as PDF” feature did not download the profile overview (short company description), but all information sections of the company profile.

5.6.6 Profile view

5.6.6.1 General issues and remarks

All users agreed on the uselessness of the completeness indicators in the profile view. However, two of the three participants showed appreciation for the navigation tabs, describing them as user-friendly, although one user suggested for the tabs to be lowered in order to be more clearly visible. Another suggestion relating to the navigation tabs was to fix the tabs at the top of the window so as to make it possible for users to always see what section of the company profile they are reading.

One participant criticized the lack of visibility and accessibility of the “Update profile” link and mentioned that many users struggled to update their company profile for that precise reason. In conjunction with the issues identified on the results display page, the same participant suggested that the print function be replaced by a “Download as PDF” button, currently not available in the profile view.

Moreover, as on the results display page, users had overlooked the bookmark symbol / feature and became first aware of it only when the function was explicitly mentioned by the interviewer.

5.6.6.2 General company profile

The two interviewees that focused on the company profile declared they were satisfied with the current information displayed.

5.6.6.3 Information section „Products“

The one issue uncovered within the “Products” information section was the impossibility of clicking on a product name in the products overview (overview over Biotech development phases) in order to get to the detailed description of the product in question. This problem, coupled with the fact that the descriptions listed below the overview are not always in the same order as they are in the overview, made it difficult for the user to figure out where the information was located.

5.7 Diagnosis

If one refers to the five dimensions of usability as defined by Whitney Quesenbery⁹, the usability issues identified within the Biotechgate components under focus can be divided into the following three categories (in order of severity):

1. Learnability-related issues: users lack both clear and concise information about the general features and services provided by Biotechgate as well as indications and

⁹ See chapter 3.3.

support on the search-related features available in the database and their functionality. As a consequence, they miss / overlook many global and search-related features that could be useful to them in carrying out their work assignments (which naturally also affects the efficiency of the database), or are simply unable to use the features they encounter, because they ignore or are unsure of their functionality (context-sensitive help does not cover all features). Their inability to find the self-support documentation (and to a certain extent the lack of appeal of the information) provided by Biotechgate only adds to the severity of this problematic. This issue category is considered the most significant, for it concerns all components, from the information architecture to the profile view.

2. Efficiency-related issues: among the problems considered here as efficiency-related figure all the issues concerning the lack of a feature needed by users (such as the impossibility for users to download their search results as PDF), the lack of visibility of a feature (such as the “create an e-mail alert” function) and those relating to the deficient functionality of a feature (such as the print feature and the completeness indicators). Most of the issues in question were found in the results display page, although the search masks and the profile view also received critical comments. However, this issue category is mostly page and feature-specific, and as such is not considered as the most serious / severe.
3. Effectivity-related issues: only single effectivity-related issues were uncovered, mostly in the *Companies* search mask and the *Products* profile view. However, these problems are rather secondary.

In summary, the main issues needed to be addressed in the redesign are the following:

- The website is not learnable;
- The website lacks efficiency.

6 Requirements engineering

6.1 Goals and research questions

A formal list of requirements is needed to determine, on the basis of the interviews and the redesign assignment details provided by Venture Valuation, what exactly the new design should bring and what general conditions need to be satisfied for the project to be considered a success by both Venture Valuation and the Biotechgate target audience / user community. The two essential questions needing to be answered at this stage are the following:

- What general conditions does the new design concept for the Biotechgate subscriber section need to fulfill to ensure its compliance with the needs and expectations of Venture Valuation?
- What usability-specific requirements does the new design concept need to fulfill in order to effectively improve the usability of the four core Biotechgate components under focus for all users of the database?

A further, non-negligible problem with direct consequences on the success and the quality of the project was the fact that the data on the new design of the public website of Biotechgate, developed by Venture Valuation, was incomplete: at the time, the sitemap and mock-ups provided by the company were still under construction, making it impossible to precisely determine what the final design and the corresponding information architecture would comprise and look like. This naturally had an influence on the project at hand and its requirements set, since it was important for the two websites, namely the public and the subscriber section of Biotechgate, to be coherent and consistent with one another. Consequently, the requirements list for the redesign of the subscriber section of Biotechgate needed answers to the two following additional questions:

- What requirements can be fulfilled with certainty in consideration of the project data currently available (for what requirements is sufficient data available for their fulfillment to be formally ascertained)?
- What requirements (estimated necessary for the success and the quality of the redesign project as a whole) are in danger of not being entirely fulfilled by the new design concept in consideration of the project data currently available or can simply not be taken into account (for what requirements is there not enough data available for their fulfillment to be possible / formally ascertained)?

6.2 Methodology overview

Applicable best practices were sought to determine what requirements analysis strategy was the most appropriate or efficient to formulate requirements on the basis of the data gathered

in the interviews. Finally, the selection of usability goals based on known usability issues within an interface (or software) suggested by Hackos and Redish (1998, pp. 348-351) was applied, as it was felt that this method ideally suited the goals and needs of the redesign project.

The first step in the requirements engineering process was thus to list all known usability issues of the Biotechgate portal, whereby both the results of the interviews conducted during the user needs assessment phase and the elements uncovered by Venture Valuation prior to the launch of the redesign project were taken into account. For each issue, a specific usability goal was formulated.

More formal requirements were then formulated on the basis of the usability goals set previously, and added to the existing general requirements that had been developed at the beginning of the redesign project. However, since requirements engineering is also an iterative process, new requirements identified throughout the project development were progressively added to the set until the requirements list was judged complete.

The requirement statements were formulated in compliance with the guidelines provided by Hull et al. (2010, pp. 84-85 and p. 89), namely:

- The language used throughout the requirements set is constant;
- Each requirement is uniquely identifiable;
- Each requirement statement refers to one single requirement;
- All requirements are clearly understandable;
- Each requirement statement is precise and concise;
- All requirements are abstract and as such do not impose or refer to any concrete layout-specific solution or implementation of the requirement in question;
- All requirements are in compliance with the law.

Two further guidelines mentioned by Hull et al. (2010) refer to the feasibility and the verifiability of requirements. Although certain requirements taken into account for the project cannot be fully implemented or verified within the framework of this thesis, they were added to the requirements set because it was felt that the requirements list would be incomplete without them. Furthermore, the inclusion of the requirements in question makes it possible to point out the weaknesses of the design concept and thus to give a more realistic evaluation of its state of development at the end of the project, taking into consideration that the objective of the redesign concept is to be successfully implemented in the near future.

6.3 Requirements set

The redesign of Biotechgate essentially had to fulfill two kinds of requirements, or rather had to satisfy requirements from two different sources: firstly, the general conditions given by Venture Valuation, for which the redesign was being made, and secondly, the more usability-specific requirements directly derived from the interviews conducted within the framework of the user needs assessment phase (with a few exceptions, for Venture Valuation did mention specific usability issues within the framework of the work assignment on which the current project is based).

The minimal general and usability-related requirements for the redesign are listed hierarchically below. Considering the scope of the current thesis, it was not judged necessary to establish a list of all further (implicit) requirements that were relevant for the redesign, such as general design- and usability-specific guidelines. The following requirements list aims to provide a goal-oriented requirements framework for the redesign of the four Biotechgate components under focus: main navigation, search masks, results display page and profile view.

The requirements whose feasibility and verifiability cannot be (fully) ascertained within the framework of the current thesis are marked with double stars (**).

1. General requirements (redesign framework)

- 1.1. The new design must stay as close as possible to the current layout of the Biotechgate website.
 - 1.1.1. The location and the “look & feel” of the main components (navigation¹⁰, sidebars, main content and footer) of the current Biotechgate website must be preserved.
 - 1.1.2. The layout characteristics belonging / contributing to the corporate (visual) identity of Biotechgate (such as basic color scheme, font family and company logo) must be preserved.
- 1.2. **The contents of the new subscriber section must be coherent and, within the realms of possibility, consistent with the information architecture developed for the new public website of Biotechgate.
 - 1.2.1. **Unnecessary overlaps in the contents of the new public website and the new subscriber section must be avoided.
 - 1.2.2. **If an element of the information architecture requires being available on the public website as well as in the subscriber section, the element in question must be accessible under the same label (consistency).
- 1.3. The implementation of the new design must require the least effort (amount of work) possible from Venture Valuation (feasibility of the redesign).

¹⁰ This requirement refers to the location of the main navigation and not its structure (contents).

- 1.4. **The main navigation must comprise all menu categories given by Venture Valuation and / or considered relevant to the subscriber section (completeness).

2. Usability-specific requirements

2.1. General usability-specific requirements

- 2.1.1. The users must be able to quickly recognize what information, features and services the subscriber section can provide them with.
- 2.1.2. The users must be able to familiarize themselves independently with all the search-related features available in the database and their functionality.
 - 2.1.2.1. It must be possible for the users to quickly determine what search-related features are available in the database and how they work.
 - 2.1.2.2. The users must be able to easily access detailed information on the search-related features available in the database and their functionality.
 - 2.1.2.3. It must be possible for the users to quickly learn / understand the functionality of the search-related features of the database without their needing to resort to tutorials (context-sensitive help), irrespective of their location within the subscriber section.

2.2. Information architecture and main navigation

- 2.2.1. The users must be able to easily access the formal information document "Definitions" on the categorization of companies within the Biotechgate databases.
- 2.2.2. The contents of the Resource Center must be clear to the users without their needing to open / visit it.
- 2.2.3. It must be possible for the users to easily access the Biotech Financing Summary.

2.3. Search masks

- 2.3.1. The dependency between filters and sub-filters must be clearly visible and understandable in all search masks.
- 2.3.2. The users must be provided with appropriate context-sensitive information as to why a sub-filter menu is inactive / does not display any options.
- 2.3.3. It must be possible for the users conducting a search to quickly find a specific company sub-sector in the corresponding filter menu without needing to interrupt their search, even if they are not familiar with the categorization of companies within the Biotechgate databases.

2.4. Results display page

- 2.4.1. The different features and elements composing the results display page must be clearly arranged.
- 2.4.2. The different features and elements composing the results display page must make full / optimal use of the space available.

- 2.4.3. It must be possible for the users to print or download all or single entries of / from the results display page in the shown / given layout.
- 2.4.4. The users must be able to print or download all or single information sections of a company profile in the shown / given layout without opening the profile.
 - 2.4.4.1. It must be clear that it is possible to print or download all or single information sections of a specific company profile from the results display page.
- 2.4.5. The number of results shown on a single page of the results display must be customizable.
 - 2.4.5.1. It must be possible for all search results found to be shown on one single page.
- 2.4.6. It must be possible for users to create quickly and easily an e-mail alert on a specific search.
 - 2.4.6.1. The “create an e-mail alert” feature must be clearly visible.
 - 2.4.6.2. Users must be able to create an e-mail alert on a specific search in one single step.
- 2.4.7. The users must be able to check and understand exactly what search query produced the results displayed on the results display page.
 - 2.4.7.1. The exact search query resulting from the selection of different filter options or / and free text input (incl. Boolean operators) must be visible on the results display page at all times.
- 2.4.8. The use of the “Order by” dropdown menu must be intuitive and efficient.
 - 2.4.8.1. The users should be able to order the results by a given criterion and have them shown in ascendant (alphabetical order) or descendant (reverse alphabetical order) in one single step.
 - 2.4.8.2. **Only relevant “Order by”-options must be shown to the users.
- 2.4.9. It must be possible for the users to quickly see / understand what information is available on a specific company without opening the company profile.
- 2.4.10. The company-specific bookmark feature on the results display page must be clearly visible.

2.5. Profile view

- 2.5.1. The users must be able to see at all times which information section of the company profile they are currently reading.
- 2.5.2. The users must be able to see and access at all times the (further) information sections that are available within the company profile they are reading.
- 2.5.3. It must be possible for the users to quickly and easily report a mistake within (all sections of) a company profile.
- 2.5.4. The “Update profile” feature must be clearly visible at all times.

- 2.5.5. The users must be able to print or download all or single information sections of a company profile in the shown / given layout from the profile view.
- 2.5.6. The use of the bookmark feature(s) within the profile view must be intuitive for the users.
 - 2.5.6.1. The company-specific bookmark feature must be clearly visible.
 - 2.5.6.2. The difference between the company-specific and item (product, technology, person etc.)-specific bookmark feature must be clearly visible and understandable.
 - 2.5.6.3. The item (product, technology, person etc.)-specific bookmark feature must be clearly visible.
- 2.5.7. In information sections composed by an information overview and a detailed information / description section, it must be possible for the users to access the detailed descriptions from the information overview.
- 2.5.8. The “Management” section must satisfy the new content-related requirements set by Venture Valuation.
 - 2.5.8.1. It must contain the name, function / role, e-mail address, phone number and a link to the LinkedIn profile of all persons listed in the section in question (the fields are mandatory).
 - 2.5.8.2. It must be possible for the users to see the following information on all persons listed in the section in question: information about their background and work assignments (detailed function description) as well as their contact details.
 - 2.5.8.3. The users should be able to add to their existing contact details with postal address, personal website URL, personal blog URL and links to different personal social media pages (Facebook, Xing etc.).

7 Prototyping

7.1 Goals and Research Questions

The main goal of the prototyping phase was to find, develop and illustrate conceptual, architectural and visual solutions to the known usability issues within the core components of the Biotechgate subscriber section as well as to the additional requirements and challenges resulting from the restructuring of the whole website. The prototyping process revolved around the following questions:

- What general changes and / or additions can be made to the current concept of the subscriber section in order to fulfill the requirements set for the redesign?
- What are the different conceptual, architectural or purely visual solutions conceivable (within the given requirements set) to improve the usability of the core components of the Biotechgate subscriber section under focus?

The result of the prototyping phase had to be an interactive prototype representing the new, usability-optimized concept fulfilling all requirements set for the redesign comprising all essential components under focus.

7.2 Methodology Overview

The very first step of the process was (as recommended by Hamm 2014, pp. 32-33) the definition of a global conceptual design, that is, a suitable information architecture and content strategy in the form of (in this case, informal) general page descriptions (contents, form, basic interactions) for all pages within the fixed scope of the prototype, on the basis of which the first wireframes could be created. Those structural elements were then progressively fine-tuned throughout the whole prototyping phase, as new developments and findings made changes necessary.

The scope of the prototype was discussed and set with Venture Valuation prior to launching the practical prototyping phase of the project. Because of the many similarities between the different search masks available, it was decided to only include the two search masks *Companies* and *Licensing opportunities* and the three information sections *Company* (general company profile), *Products* and *Management* of the company profile, by means of which the most significant issues specific to the search masks and the profile view could be fixed – and the solutions found subsequently tested during the usability-testing phase. At one point, the possibility of including the “deals” search mask along with the corresponding results display page and profile view was mentioned, but it was later discarded due to the limited resources available. In addition to the components mentioned above, it was agreed to provide the prototype with a homepage even though this did not explicitly belong within the

scope of the redesign project, for on the grounds of the issues uncovered during the user needs assessment phase, it was felt that the homepage could / would play an important role in illustrating the core idea behind the new design concept.

The prototyping process was an iterative one, in which each iteration comprised three steps or milestones: wireframe, mock-up and prototype. Each of those three steps could in turn also be subject to several iterations until it was felt that the resulting prototype satisfied the general and component-specific requirements considered relevant at that particular stage. The global prototype development process followed a general-to-specific approach and as such, each iteration resulted in a refined version – either in terms of fidelity or in terms of scope – of the original prototype. The starting point for a new iteration was generally given by the realization of a “nano” usability test (Goodman et al. 2012, p. 12) or of an informal usability walkthrough with co-students, family members or friends. Those small and in general component-specific usability assessments were mostly focused on graphical elements, since it was difficult for evaluators without a life sciences or business background to determine what Biotechgate really was and what could be achieved with it. The usability walkthrough leading to the first functional prototype (V1) was conducted remotely with the co-founder of Biotechgate (and contact person at Venture Valuation throughout the redesign project), so as to make sure that the new vision for the database was in compliance with the expectations of the company.

The completion of the first functional prototype (V1) initiated a short preliminary usability-testing phase composed of two moderated remote usability pre-tests¹¹. The evaluators for these two tests were recruited from the pool of six users put together for the final remote usability tests¹². In accordance with the principles of the Rapid Iterative Testing and Evaluation (RITE) method, according to which just one participant can be enough to uncover an issue and its (potential) solution (Medlock et al. [2002]), the most significant issues identified during the tests were fixed immediately after each evaluation, as opposed to waiting for the two tests to be completed before carrying out any modifications (Barnum 2010, pp. 113-116; Medlock et al. [2002]). As such, the second pre-test was conducted on a second, refined version of the first functional prototype (V2) and in turn led to the creation of a third version of the prototype (V3). The prototype then went through a last iteration before the launch of the “official” usability-testing phase.

The RITE approach was applied to the pre-tests in order to be able to guarantee the delivery of a globally usable new design concept at the end of the redesign project. This would have been impossible with only the one official round of usability testing, since the bug fixes

¹¹The remote tests conducted within the prototyping phase as referred to as pre-tests to differentiate them from the tests performed during the subsequent “official” remote usability-testing phase.

¹² Details about the recruiting process for the moderated tests are available in chapter 9.4.2.

resulting from this single tests round could not have been in turn validated by end users of Biotechgate. The main goal of the use of RITE was therefore to have the main concept components go through three instead of one round of usability testing with real (potential) Biotechgate users.

Throughout the whole prototyping process, ideas on how to structure, arrange and place layout components were gathered by visiting other interfaces / websites comprising similar components. It was first attempted to investigate how some of the competitors of Biotechgate, such as Citeline¹³, Medtrack¹⁴ and Evaluate¹⁵, handled the usability challenges and problems common to this type of database. However, a major impediment to this approach was the impossibility of getting a look at their respective subscriber section without creating an account, a step generally reserved for enterprises. Although some observations could be made about the design and the contents of their public websites, such as the global information architecture of the site and the structure of the main navigation, other sources were needed in order to see more database-specific solutions for the development of key components of the new concept. As such, databases specialized in fields other than biotechnology, such as LISA¹⁶ and LISTA¹⁷, were consulted for the “tracking” of potential solutions, but quite specifically for issues in the results display page, considering the significant difference between the respective search-related needs and possibilities of those two types of databases. Additionally, further more common, “everyday” websites were consulted as well.

7.3 Prototyping tool

All wireframes, mock-ups and prototypes were developed with Axure¹⁸, a software designed for the development of interactive prototypes. The range of features provided by the program to design, develop, preview and publish the project covered all the needs specific to the thesis project. Axure supports the creation of a customizable, project-specific widget libraries and the definition of masters (combination of graphical elements whose appearance and location can be saved separately, making it possible for the elements in question to be added to several pages of the project while being stored in one single place, which means that modifications made to that central file will be visible in all further pages comprising the component in question). Advances interactions can be added through so-called *dynamic panels*, to which different states can be added and then trigger events for state changes

¹³ <http://www.citeline.com/>

¹⁴ <http://www.medtrack.com/>

¹⁵ <http://www.evaluategroup.com/Default.aspx>

¹⁶ <http://www.proquest.com/products-services/lisa-set-c.html>

¹⁷ <http://www.libraryresearch.com/>

¹⁸ <http://www.axure.com/>

defined. Specific panel and widget states as well as variable values can be defined on page load, making it possible to adapt the contents and the layout of a page in function of external page events.

Axure projects can either be previewed locally or published for free on the Axure cloud *AxShare*, from where it can be made accessible to other people, for example evaluators. AxShare also provides additional features for managing the projects in the cloud and adding plug-ins to the pages of a project.

In addition, the software provides its users with extensive support, from tutorials to an online-forum in which users can interact with other customers as well as with employees of the company.

7.4 Conceptual design

Apart from the current design, that is, the appearance, structure and contents of the Biotechgate components under focus, the basis for the new concept was the site map (see figure 7-1) of the new subscriber section provided by Venture Valuation, which gave an overview over the contents that had to be taken into account in the information architecture and in the structure of the main navigation of the redesign.

ID	Page Title / Content Area	Type	Summary & Comments
0	Homepage	Start Screen	Page after log-in; Links to database section; may be overview on current subscriptions; content to be discusses - what does make sense?
1	Database		
1.1	Companies and Benchmark Deals		
1.1.1	Companies	Search form	
1.1.2	Products	Search form	
1.1.3	Technologies	Search form	
1.1.4	Financing rounds	Search form	
1.1.5	Company valuations	Search form	
1.1.6	Management details	Search form	
1.1.7	Licensing opportunities	Search form	
1.1.8	Benchmark Deals	Search form	Search form that is currently available under "Deals"
1.2	Investor Database		An additional module which we will integrate; Just consider in navigation
2	Global Life Science Map	Map Search	See http://www.biotechgate.com/gate/v3/companies.php?info=global_map
3	Reports & Industry News		
3.1	Biotech Financing Summary	Download page	Biotech Financing Summary, see http://www.biotechgate.com/gate/v3/statistics.php?info=vcdeal
3.2	Companies by Sector		http://www.biotechgate.com/gate/v3/statistics.php?info=statistics
3.3	Companies by Country		http://www.biotechgate.com/gate/v3/statistics.php?info=countries
3.4	Industry News		http://www.biotechgate.com/gate/v3/news.php
3.5	Life Science Jobs		http://www.biotechgate.com/gate/v3/jobs_overview.php
3.6	Life Science Conferences		http://www.biotechgate.com/gate/v3/events.php
3.7	Resource Center		http://resourcecenter.biotechgate.com/#sthash.oflAbfaM.dpbs (open in new window)
4	Contact & Support		http://www.biotechgate.com/gate/v3/contact.php

Figure 7-1: Original site map of the new subscriber section provided by Venture Valuation

The new concept was to revolve around the following design principles and components:

- A color-based differentiation of the different types of elements composing the basic layout of the website, that is, main navigation and other navigation buttons, database-related buttons (shortcuts to the different databases, with a different color for each database) and sidebar, so as to make the structure, organization and prioritization of the elements displayed clearly visible and understandable;
- A restructuration of the information architecture and content strategy leading to a “reunification” of the elements that belong together, in particular of the information about the database and search-related features;
- A homepage providing an overview over the main services and features provided by Biotechgate in order for the user to be able to quickly see what he could find on the website and where;
- An information page containing an overview over the search-related features available in the database (bookmarks, notes, save search, create an e-mail alert etc.) and leading to more detailed information, i.e. tutorials, on each of the features mentioned;
- An improvement, through systematic addition to and / or differentiation / customization, of the context-sensitive help.

The global objective of those five points / measures, affecting all components and pages of the redesign, was to make the new website more learnable and efficient. The further issues identified during the user needs assessment phase were to be solved through component-specific changes, whose nature was not precisely defined at this stage.

7.5 Usability pre-tests and refinement of the prototype

7.5.1 First functional prototype (V1)

7.5.1.1 Main navigation

In the interviews conducted during the user needs assessment phase¹⁹, significant issues had been uncovered within the sitemap provided by Venture Valuation (shown in figure 7-1). On the basis of those findings, the main navigation was restructured as shown in figure 7-2.

¹⁹ See chapter 6.6.3.

ID	Pate Title / Content Area	Type	Summary & Comments
0	Homepage	Start Screen	Overview over the Biotechgate features (in accordance with the different categories / menus of the main navigation)
1	Search		==> Leads directly to the overview over the search-related features
2	Global Life Science Map	Map Search	See http://www.biotechgate.com/gate/v3/companies.php?info=global_map
3	Industry News		http://www.biotechgate.com/gate/v3/news.php
3.1	Industry News		
3.2	Biotechgate Financing Summary	Download page	Biotech Financing Summary, see http://www.biotechgate.com/gate/v3/statistics.php?info=vcdeal
3.3	Life Science Conferences		http://www.biotechgate.com/gate/v3/events.php
3.4	Life Science Jobs		http://www.biotechgate.com/gate/v3/jobs_overview.php
4	Resource Center		
	Biotechgate Tutorials	RS Category	
	Life Sciences Reports	RS Category	http://resourcecenter.biotechgate.com/category/reports/#sthash.gn5m5uJv.dpbs
	Biotechgate Press Releases	RS Category	http://resourcecenter.biotechgate.com/category/press-releases/#sthash.tGFdIRqN.dpbs
	Biotechgate Publications & News	RS Category	http://resourcecenter.biotechgate.com/category/publications/#sthash.7cKold2i.dpbs
5	Biotechgate Statistics		
	Companies by Sector		http://www.biotechgate.com/gate/v3/statistics.php?info=statistics
	Companies by Country		http://www.biotechgate.com/gate/v3/statistics.php?info=countries
6	Contact & Support		
	Add / Update Company		http://biotechgate.com/gate/v3/add_company.php
	Add Event		http://biotechgate.com/gate/v3/event_info.php
	Demos & Tutorials	RS Category	http://resourcecenter.biotechgate.com/category/features/#sthash.sy7PPxR3.dpbs
	Definitions		http://biotechgate.com/gate/v3/faq.php
	FAQ		http://biotechgate.com/gate/v3/faq.php
	Contact & Impressum		http://www.biotechgate.com/gate/v3/contact.php

Figure 7-2: Sitemap of the new concept (V1) for the Biotechgate subscriber section

The first menu option, originally labeled *Database* was renamed into *Search* in order to show that this category was dedicated to the searching the database and not finding information on Biotechgate. However, because there are nine different search masks for three databases, it was decided not to list the various search masks as menu options – as it is the case in the current website. As a consequence, the *Search* navigation option led to the new *Search* start page (see chapter 8.5.1.3). The purpose of this structure was also to “bring” users to the page.

A second significant change was the creation of an additional menu category for the *Resource Center*²⁰ instead of placing it under the *Industry News* category. Moreover, the different categories of the Resource Center, that is, *Features and Support*, *Life Sciences Reports*, *Press Releases* and *Publications and News*, were listed as menu options so as to make it possible for the users to get an overview over the contents available in the Resource Center without needing to actually visit it. Biotechgate’s competitor Citeline²¹ applies a similar solution (see figure 7-3).

²⁰ <http://resourcecenter.biotechgate.com/#sthash.JT26iie3.dpbs>

²¹ <http://www.citeline.com/>

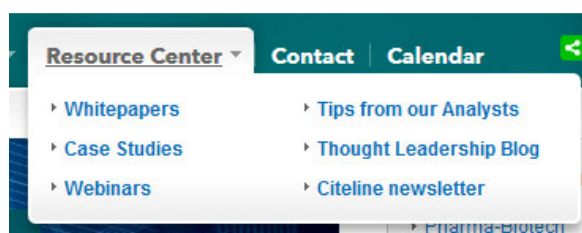


Figure 7-3: Resource Center drop-down options within the main navigation of Citeline

A new main navigation category *Biotechgate Statistics* was also created for the two pages presenting the statistics of the Biotechgate database, for it was felt that it belonged neither to the *Industry News* nor to the *Contact & Support* category.


Finally, additional menu options were added to the *Contact & Support* category, among which the *Definitions* sheet is the most noteworthy: currently attached to the FAQ page, it is not visible in the main navigation. However, since two interviewees had described it as a valuable tool when working in Biotechgate, it was felt that it needed to be more easily accessible.

7.5.1.2 Basic layout and homepage

To comply with the redesign requirements and the wish of the users, it was attempted to stay as faithful as possible to the current Biotechgate visual “identity”; nevertheless some significant changes were made to the basic components of the website (see figure 7-4). First, the main or basic green color used in the current website was replaced by a lighter green tone, similar to the one used in the Biotechgate logo, in order to make the navigation menu options more readable without writing them in bold (which would have required either more space or a smaller font size, neither of which were found suitable). A further general modification was the selection of a bigger default font size, as recommended by some typography specialists (Luzuriaga 2011) so as to make reading the main contents of each page more agreeable.

The right sidebar underwent some changes as well, most notably the deletion of the *User navigation* box – replaced by a simple *My Account* link in the top right corner of the page, as is usual on the web – in favor of a box exclusively dedicated to the users’ *Bookmarks & Notes*. Modifications were also undertaken in the left sidebar: first, the addition of a *Search* button at the top of the bar (supposed to indicate that the menu options underneath were search masks and to lead to the *Search* start page²²), and second, coloring of the shortcuts to the different search masks available, whereby each color stood for a particular database: orange for the company database, pink for the licensing deals database and violet for the investors database.

²² See next subchapter 8.5.1.3.



[Search](#) [Global Life Science Map](#) [Industry News](#) [Resource center](#) [Biotechgate statistics](#) [Contact & Support](#)

[Home](#) [My Account](#) [Log off](#)
 Diane Golay
 [Last visit: 8 Jun 2014]

[Home](#)

Search

Company database
 (31'024) Companies
 (37'780) Products
 (3'835) Technologies
 (5'491) Financing rounds
 (463) Company valuations
 (103'907) Management details
 (6'038) Licensing opportunities

Deals database
 (1'631) Deals

Investor database
 Investor database

Welcome to the Biotechgate Subscriber Section

Search the Biotechgate databases, locate life science companies around the world and get the latest industry news

Check your [account settings](#) on [My Account](#)
 or [add, update or recommend a company](#) on the [Add a company page](#)

Biotechgate Features Overview

Database Search

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean euismod bibendum laoreet. Proin gravida dolor sit amet lacus accumsan et viverra justo commodo. Proin sodales pulvinar tempor.

[Search now](#)

Global Life Science Map

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[Locate companies](#)

Latest Industry News

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[See the latest news](#)

Reports & Downloads

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[Visit our resource center](#)

Database Statistics

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[See the statistics](#)

Contact & Support


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[See all demos & tutorials](#)

Already familiar with Biotechgate?

Choose another welcome page: Search Companies Select

Get started in Biotechgate




Biotechgate General Demo

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean euismod bibendum laoreet. Proin gravida dolor sit amet lacus accumsan et viverra justo commodo. Proin sodales pulvinar tempor. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus.

Want to learn more? [See all demos & tutorials](#)

[Back to top](#)

Saved Searches
 You have 1 saved searches. Click on a link to load a saved search.
[Learn more about this feature](#)

My Saved Search


Bookmarks & Notes

- **Bookmarks**
- Companies (1)
- Products
- Management
- **Notes**
- All notes
- Profiles with notes
- [Learn more about this feature](#)

Partner Section

- **Statistics download**
- Company stats
- Company stats archive
- Pipeline & financing rounds
- Indication matrix
- **Profile download**
- **News**
- Add news
- Edit my news
- See all news
- **Information**
- API Documentation
- Users' guides
- [Learn more about this feature](#)

Latest updates
 13 June 2014

- Targeted Cell Therapies, LLC
- Sound Pharmaceuticals, LLC
- CrispTek, LLC
- J.A.R. Pharmaceuticals, Ltd.
- MicroLeman

Updates within the latest 30 days:

- 1'792 Company profiles
- 873 Products
- 68 Technologies
- 160 Financing rounds
- 3'219 Management details

2014 Venture Valuation

[To the top](#)

[Terms of use & Privacy Policy](#)

Figure 7-4: Homepage of the first functional prototype (V1)

The last noteworthy change within the basic components of the layout is the shift of the quick text search field from the top of the header to the space located between the header and the right sidebar. This change was made necessary because of the new layout of the header, in which there was no space left for the search field. However, since the mask remains in the top right corner – where such search masks are generally located – it was felt that this modification was acceptable. The drop-down menu originally coupled with the text field was tentatively deleted, on the grounds that it was not needed for such a quick text search.

The first element specific to the homepage was the welcome banner, supposed to indicate to the subscribers that they were now in the subscriber section. In compliance with the conceptual design, the main content of the homepage provided an overview over the different features of Biotechgate in the form of rectangular boxes comprising a title and a description (at this stage, dummy text), each dedicated to a specific category of the main navigation. The purpose of this kind of display was for the bold titles to catch the users' attention and to prompt them to glance through the description of the features. To comply with the wish of several interviewees, a short demo video was added to the page, but not in the top half where it might "hide" the features overview.

Finally, the *User navigation* box in the right sidebar was deleted. In its place, a link to the *My Account* section was added at the top right corner of the page.


7.5.1.3 Search start page

The Search start page (shown in figure 7-5) pursued two goals: providing users with a quick, easily accessible and easy to remember overview over the available search-related features and their basic functionality as well as facilitating access to the detailed feature tutorials published in the *Resource Center*. The design and the display of the contents followed the same principles as the homepage.

Search the Biotechgate databases

See how it works

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean euismod bibendum laoreet. Proin gravida dolor sit amet lacus accumsan et viverra justo commodo. Proin sodales pulvinar tempor. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Nam fermentum, nulla luctus pharetra vulputate, felis tellus mollis orci, sed rhoncus sapien nunc eget odio.



Database features in detail

<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;"> <h4 style="margin: 0;">Narrow down searches</h4> <p style="font-size: 0.8em; margin: 0;">Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean euismod bibendum laoreet. Proin gravida dolor sit amet lacus accumsan et viverra justo commodo. Proin gravida dolor sit amet lacus accumsan et viverra justo commodo.</p> <p style="text-align: right; font-size: 0.8em;">See tutorial</p> </div>	<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;"> <h4 style="margin: 0;">Save searches & create alerts</h4> <p style="font-size: 0.8em; margin: 0;">Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean euismod bibendum laoreet. Proin gravida dolor sit amet lacus accumsan et viverra justo commodo. Proin gravida dolor sit amet lacus accumsan et viverra justo commodo.</p> <p style="text-align: right; font-size: 0.8em;">See tutorial</p> </div>
<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;"> <h4 style="margin: 0;">Bookmark profiles & items</h4> <p style="font-size: 0.8em; margin: 0;">Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean euismod bibendum laoreet. Proin gravida dolor sit amet lacus accumsan et viverra justo commodo. Proin gravida dolor sit amet lacus accumsan et viverra justo commodo.</p> <p style="text-align: right; font-size: 0.8em;">See tutorial</p> </div>	<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;"> <h4 style="margin: 0;">Export results to Excel & PDF</h4> <p style="font-size: 0.8em; margin: 0;">Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean euismod bibendum laoreet. Proin gravida dolor sit amet lacus accumsan et viverra justo commodo. Proin gravida dolor sit amet lacus accumsan et viverra justo commodo.</p> <p style="text-align: right; font-size: 0.8em;">See tutorial</p> </div>
<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;"> <h4 style="margin: 0;">Add notes to profiles</h4> <p style="font-size: 0.8em; margin: 0;">Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean euismod bibendum laoreet. Proin gravida dolor sit amet lacus accumsan et viverra justo commodo. Proin gravida dolor sit amet lacus accumsan et viverra justo commodo.</p> <p style="text-align: right; font-size: 0.8em;">See tutorial</p> </div>	<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;"> <h4 style="margin: 0;">Add updates & report mistakes</h4> <p style="font-size: 0.8em; margin: 0;">Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean euismod bibendum laoreet. Proin gravida dolor sit amet lacus accumsan et viverra justo commodo. Proin gravida dolor sit amet lacus accumsan et viverra justo commodo.</p> <p style="text-align: right; font-size: 0.8em;">See tutorial</p> </div>
<div style="border: 1px solid #ccc; padding: 5px;"> <h4 style="margin: 0;">Download profiles as PDF</h4> <p style="font-size: 0.8em; margin: 0;">Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean euismod bibendum laoreet. Proin gravida dolor sit amet lacus accumsan et viverra justo commodo. Proin gravida dolor sit amet lacus accumsan et viverra justo commodo.</p> <p style="text-align: right; font-size: 0.8em;">See tutorial</p> </div>	

Figure 7-5: Content of the *Search* start page (V1)

7.5.1.4 Search masks

The first functional prototype comprises only the *Licensing opportunities* (products) search mask (figure 7-6). Because of the similar basic layout of all search masks, it was planned to assess the usability of the solutions applied to this one search mask before including the *Company* mask to the prototype.

The screenshot displays a search interface for 'Licensing opportunities' with the following components:

- Navigation:** 'Products' (active) and 'Technologies' tabs.
- Search Bar:** A text input field with a 'search' button and a link for 'Text search tips >>'.
- Filters:**
 - Search within Medicon Valley only (checkbox)
 - Search in bookmarks (checkbox)
 - Continent / Region (dropdown)
 - Country (dropdown)
 - State (dropdown)
 - Available for out-licensing (checkbox, checked)
- Product and Phase:**
 - Type of product: All (dropdown)
 - Phase: -- No product type selected -- (button)
- Main sector / area:** A list of categories with checkboxes:
 - Cardiovascular
 - Conditions originating in the perinatal period
 - Congenital malformations, deformations and chomosomal abnormalities
 - Digestive system
 - Diseases of the blood and blood-forming organs; immune disorders
- Therapeutic sub-sector:** No sub-sector available (button with link: Why?).
- Primary market:** GP, Specialty (checkboxes)
- Molecule type:** Antibody, Natural / Modified Protein, Other Macromolecule (checkboxes)
- Mode of administration:** Injectable, Not yet known, Oral (checkboxes)
- Marketing rights available / sought:** Africa, Australia / New Zealand, Canada (checkboxes)

At the bottom, there are 'reset' and 'search' buttons.

Figure 7-6: Content of the *Licensing opportunities* search mask (V1)

Two kinds of modifications were made to the search mask: first, the masks that belong together were put (horizontally or vertically) next to one another and second, the “activation” of a search mask was made visually visible by means of a coloration of the header of the corresponding filter list box(es) (as shown in figure 7-7).

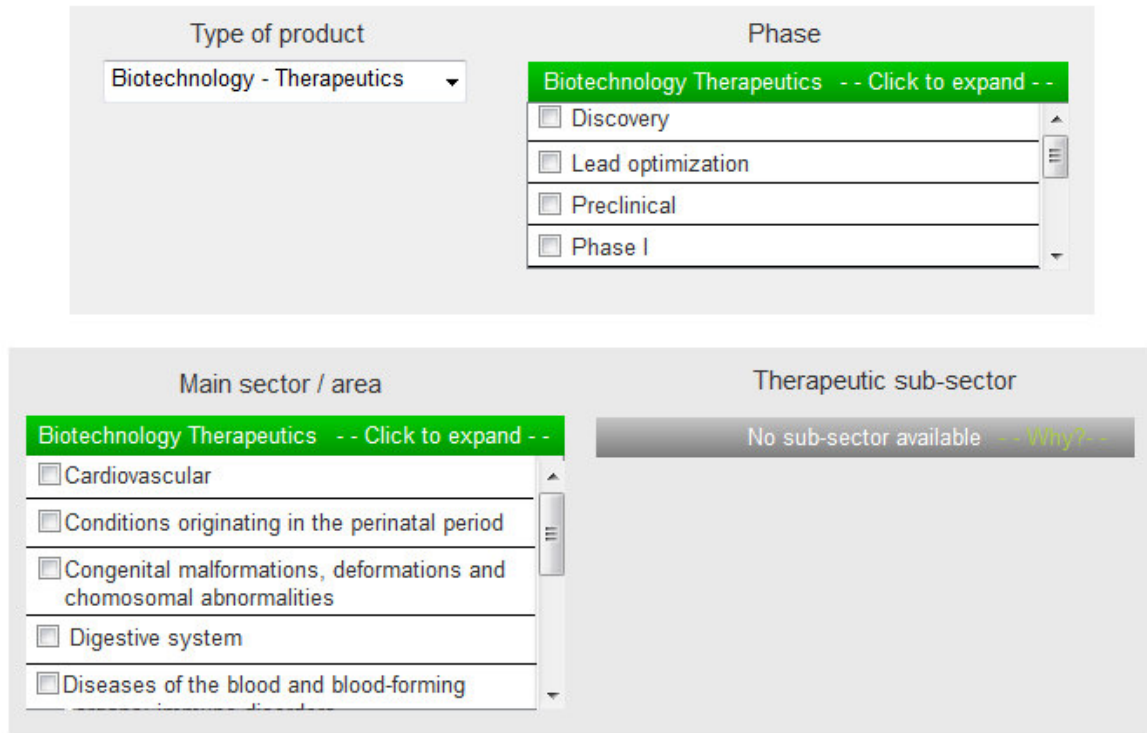


Figure 7-7: "Activated" filter list boxes after selecting *Biotechnology – Therapeutics* as *Type of product* (V1)

When a list box is inactive, a short explanation as to why that is stands in the list box header, such as “no product type selected” or “no sub-sector available”. In the latter case, the user could also click on the “Why” link next to the header label to trigger the appearance of a tooltip enumerating the possible reasons for the unavailability of the filter (as shown in figure 7-8). This was necessary because as soon as more than one main sector is selected, the Therapeutic subsector list box becomes unavailable, which is not always understandable to the user.

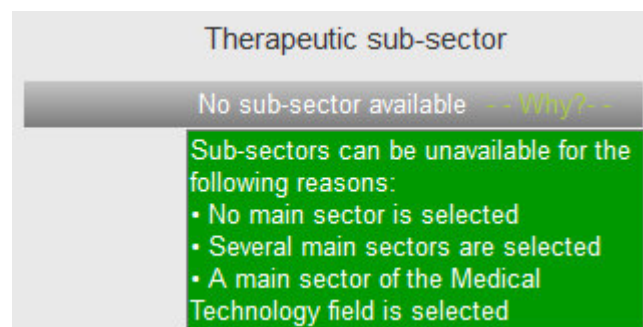


Figure 7-8: Tooltip explaining why the filter list box is unavailable (inactive) (V1)

In addition, pairs of filter list boxes “belonging” together were put on a grey background in order to make the relation between them more clearly visible and intuitive.

7.5.1.5 Results display page

The top section of the results display page (see figure 7-11) was entirely restructured. The listing of the active search filters was replaced by the display of the exact search query conducted in the database (including Boolean connectors) and was shifted to the very top of the page. The layout of the query display was inspired by the one in the LISA²³ database (shown in figure 7-9). All features directly related to the search query, such as “Refine search” or “Save search” were placed above the search query to clearly show to what query they referred. Bringing together those different query-related elements was expected to improve the efficacy of the page. In addition, a link “Create an e-mail alert” was added to the existing ones, in order to make the feature more visible and to make it possible for the user to set an e-mail alert in one single step.

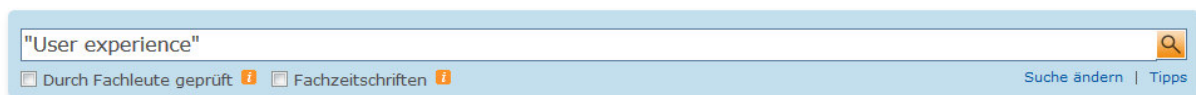


Figure 7-9: Display of the search query on the results display page of the LISA database

The other changes to the top sections were less significant: the possibility of selecting the number of results to be displayed on the page was integrated with the display of the number of results found, while the “Order by” drop-down was “combined” with the sort direction feature (as shown in figure 7-10) so as to make the feature more intuitive. In addition, a “Download results as PDF” link was added underneath the “Download results in Excel format” feature and context-sensitive help (descriptive tooltip) was added to both.

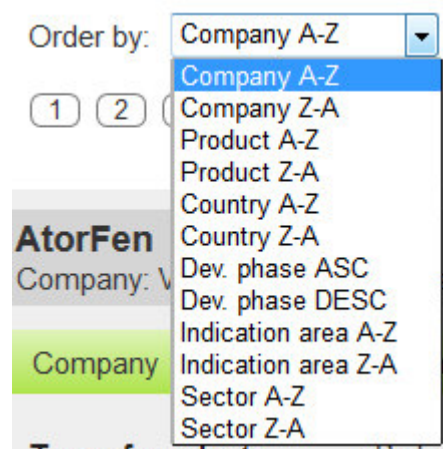


Figure 7-10: Order by drop-down menu on the results display page (V1)

²³ <http://www.proquest.com/products-services/lisa-set-c.html>

Results Overview

Current search [← Refine search](#) | [New search](#) | [Save search](#) | [Create e-mail alert](#)

Product availability (available for out-licensing) AND type of product (Biotechnology - Therapeutics and Diagnostics) AND main therapeutic sector (cardiovascular)

Results 1 to 20 out of 155 displayed [Download results in Excel format](#) [What is this?](#)

Order by: Company A-Z [Download overview as PDF](#) [What is this?](#)

1 2 3 - Next

AtorFen

Company: Veloxis Pharmaceuticals A/s [Star](#) [PDF](#)

Company	Products	Technologies	Financing rounds	Management	Deals	Add note
Type of product:	• Biotechnology - Therapeutics and Diagnostics		Description: LCP-AtorFen is their proprietary product candidate for the treatment of dyslipidemia, combining atorvastatin and the lowest dose of fenofibrate ever to be marketed.			
Indication area:	• Cardiovascular					
Availability:	• Available for out-licensing					
Development phase:	• Phase II					

Transdermal Aggrastat (tirofiban HCl)

Company: 4P Therapeutics [Star](#) [PDF](#)

Company	Products	Technologies	Management	Add note	
Type of product:	• Biotechnology - Therapeutics and Diagnostics		Description: A transdermal version of a widely used glycoprotein IIb/IIIa inhibitor class (GPI) that are currently only available for IV delivery. Transdermal delivery of a GPI promises to deliver several benefits over IV delivery, including: - Patient preference (non-invasive) - Ease of administration -...		
Indication area:	• Cardiovascular				
Availability:	• Available for out-licensing				

AB-LIFE

Company: AB/Biotics [Star](#) [PDF](#)

Company	Products	Financing rounds	Management	Add note	
Type of product:	• Biotechnology - Therapeutics and Diagnostics		Description: AB-LIFE is a probiotic formula which reduces cholesterol levels by 14%, according to a double-blind, randomized, placebo-controlled clinical trial. A key differentiating property with respect to other solutions in the market is that its mechanism of action affects both dietary and endogenous cholesterol,...		
Indication area:	• Cardiovascular				
Availability:	• Available for out-licensing				
Development phase:	• On the market				

[Back to top](#) 1 2 3 - Next

Figure 7-11: Results display page (V1)

The layout of the entries of the results list was mostly simplified: the completeness indicators were deleted, their role / function being taken over by the green navigation buttons right underneath, as was the print symbol (judged useless by an interviewee), as it was felt that it was acceptable to require from the user to download the company profile as PDF to print it out. The deletion of the completeness indicators made it possible to make the “Download as PDF” and the bookmark symbol bigger, which was expected to increase their visibility.

7.5.1.6 Profile view

The first functional prototype only comprised the *Products* information section (see figure 7-12). As for the search masks, it was planned to await the results of the two pre-tests before including further information sections.

The screenshot shows a web browser window titled "Profile - AB Biotics - Mozilla Firefox". The address bar shows the URL "127.0.0.1:32768/profile_-_ab_biotics.html". The page content includes a header with "Products of AB Biotics (last update on 09 Jun 2014)" and a "Downloaded by Charlie Brown" notice. A navigation bar contains tabs for "Company", "Products (13)", "Financing (2)", "Management (2)", and "Add Note". The main section is titled "PIPELINE OF BIOTECH PRODUCTS" and contains a table with 8 columns: Discovery, Lead opt, Preclinical, Ph. I, Ph. II, Ph. III, NDA, and On the market. The table lists several products, including AB-LIFE, AB-FORTIS, AB-RADIOB., AB-VITAMI., AB-PROBIO., AB-PYLORI., AB-HALITO., AB-GINGIB., AB-COLIC, and AB-ENHANC.. Below the table, there is a section for "BIOTECH PRODUCTS OF AB Biotics" with a star icon and the product name "AB-FORTIS". A description of AB-FORTIS is provided at the bottom.

Figure 7-12: Products information section (Profile view, V1)

The profile view was only slightly modified in comparison with the current layout. The navigation tabs were shifted down in order to fully integrate them within the profile, and header and tabs were “pinned” at the top of the window so as to be always visible. That way, users can see at all times in which information section of the company profile they are and

can more easily navigate from one section to another. The link “Update Profile”, originally at the very bottom of the page, was brought up into the header, so as to be more clearly and at all times visible / accessible. In addition, the link was completed with “Report a mistake”, giving users the opportunity to report inaccurate or outdated information within profiles of companies other than their own. This feature was added after several interviewees complained that the database contained many mistakes; as such, this new function is expected to increase the quality of the company profiles within the database.

The print function was deleted and replaced with a “Download as PDF” feature, whereby users can choose to download all or single information sections by means of a dialog window (as shown in figure 7-13).

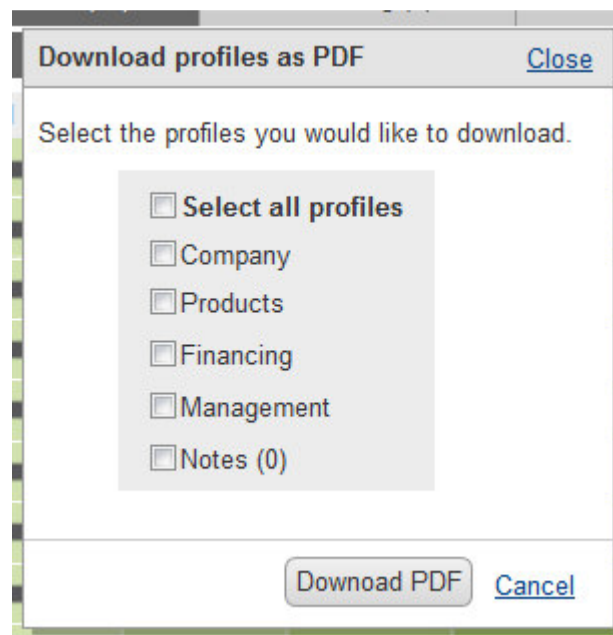


Figure 7-13: "Download as PDF" dialog window (Profile view, V1)

The two single modifications conducted in the *Products* information section itself were the conversion of the product names in the overview into anchors. The purpose of this change was for users to be led directly from the product name to the corresponding detailed product description at the bottom of the page. Additionally, clicking on a product name caused for the product-specific bookmark symbol to shift from the right to the left. This particular modification was an attempt to see if the bookmark would be better able to draw users' attention by being on the left, even if the contrast between the star symbol and the background was weak.

7.5.2 First usability pre-test

This first remote moderated pre-test took place one week before the official (and final) usability testing phase. The evaluator, chosen among the persons recruited for the final

usability tests²⁴, for this pre-test was the interviewee from the user needs assessment phase with whom the *Licensing opportunities* and *Products* information section (of the company profile) had been discussed. The task scenarios used for the test were a first draft of the tasks meant for the final moderated usability tests²⁵. As such, the pre-test had a double function: providing a first assessment of the usability of the new concept and checking the clearness, suitability and feasibility of the tasks in preparation for the official usability tests.

The test set-up comprised GoToMeeting as reverse screen-sharing tool and Techmith's Morae for audio and screen-recording as well as mouse tracking. The test tasks for the pre-tests were entered in Morae Recorder before the test, and Morae Observer was installed and started on a second laptop. The Morae Recorder was started right after the screen-sharing session had been launched. However, the computer crashed during to the test and had to be restarted, after which the test was resumed using Skype and Evaer²⁶. Due to the time lost during the interruption and in order to leave enough time for the follow-up interview, the evaluator was not asked to perform all remaining tasks.

This first pre-test led to the identifications of issues both in the prototype as well as in the wording of some task scenarios. However, the prototype-related problems uncovered concerned more its limitations than its form and contents: the main issue was that it did not allow the user to take any other path than the one considered as the "correct" answer, thus often leading the evaluator to confusion when attempting to perform an action that had not been planned. In addition, the presence of dummy text turned out to be confusing the user.

Despite the technical limitations of the prototype and the difficulties encountered by the evaluator to understand some tasks, the feedback received was mostly positive, both where the new layout and the functionality of the features tested were concerned. The only significant usability issue identified was the "loss" of the main sector selection when selecting the product type "Biotechnology - Therapeutics" *after* selecting the main sector in question, whereas the subsectors available for that particular sector stay visible. However, this issue, illustrated by figures 7-14 and 7-15, is not specific to the prototype and exists also in the current Biotechgate website. As such, and since the problem was technical rather than conceptual, fixing it in the prototype was not considered a priority.

²⁴ The recruitment process for the moderated remote usability tests is described in detail in chapter 9.4.2.

²⁵ The development process and the contents of the final usability tests are described in detail in chapter 9.4.3.

²⁶ A more detailed description of Skype and Evaer is available in chapter 6.5.

The screenshot shows a search interface with two main sections: "Type of product" and "Phase".

- Type of product:** A dropdown menu with "All" selected.
- Phase:** A button labeled "-- No product type selected --".
- Main sector / area:** A list of categories with checkboxes:
 - organs; immune disorders
 - Diseases of the ear
 - Diseases of the eye
 - Diseases of the nervous system
 - Endocrine, nutritional and metabolic diseases
- Therapeutic sub-sector:** A list of 27 sub-sectors with checkboxes:
 - Alzheimer's disease
 - Amyotrophic lateral sclerosis / motor neurone disease
 - Cerebral palsy and other paralytic syndromes
 - Charcot-Marie-Tooth disease
 - Epilepsy

Figure 7-14: Licensing opportunities search mask (V1): a single main sector is checked, no product type is selected ... (continued in Figure 7-15).

The screenshot shows the search interface after selecting "Biotechnology - Therapeutics" as the product type.

- Type of product:** A dropdown menu with "Biotechnology - Therapeutics" selected.
- Phase:** A list of phases with checkboxes:
 - Discovery
 - Lead optimization
 - Preclinical
 - Phase I
- Main sector / area:** A list of categories with checkboxes:
 - Cardiovascular
 - Conditions originating in the perinatal period
 - Congenital malformations, deformations and chromosomal abnormalities
 - Digestive system
 - Diseases of the blood and blood-forming
- Therapeutic sub-sector:** A list of 27 sub-sectors with checkboxes:
 - Alzheimer's disease
 - Amyotrophic lateral sclerosis / motor neurone disease
 - Cerebral palsy and other paralytic syndromes
 - Charcot-Marie-Tooth disease
 - Epilepsy

Figure 7-15: ... (continued from Figure 7-14) after selecting the product type "Biotechnology – Therapeutics", the main sector previously checked has been deselected; however, the sub-sectors available for that particular main sector are still shown.

In summary, the most essential finding from this first pre-test was the necessity for the prototype to be as interactive and "flexible" as possible, so as to prevent the users from meeting "dead ends" while navigating through it and / or being confused by non-functional features or unrealistic content.

7.5.3 **Second functional prototype (V2)**

All dummy *Lorem ipsum* text was replaced with realistic text paragraphs (including links) containing the kind of information presupposed by the conceptual design – both on the homepage (shown in figure 7-16) and the *Search* start page. In addition, the *Products* search mask was added, since the same search results as in the *Licensing opportunities* (products) mask could be achieved. As such, this addition let the user free of using the search mask that seemed more logical to him and did not impose the use of the *Licensing opportunities* mask. This was made possible because both masks are very similar. Moreover, pages considered beyond the scope of the prototype, like the Biotechgate statistics pages, were also added to the prototype to avoid leading the user into dead ends while performing the tasks, in an attempt to create a more satisfying “test experience” for the evaluators.

Small layout changes were also performed in the search mask(s), the results display page and in the profile view. In the search masks (see figure 7-17), filter labels written in bold were added between the different “pairs” of filter menus in order to make the different sections more clearly understandable to the users.

Check your **account settings** on [My Account](#)
or **add, update or recommend a company** on the [Add a company page](#)

Biotechgate Features Overview

Database Search

Biotechgate offers many useful features to support you in your database searches and help you manage and share your findings with colleagues.

[Learn more about search features](#)

Global Life Science Map

Our global life science map allows you to locate on the map thousands of life science companies and gives you statistical information about company clusters all around the world.

[Locate companies](#)

Latest Industry News

We keep you up to date on life science news, events and job opportunities. In addition, you find in our monthly [Biotech Financing Summary](#) information and statistics about the latest financial activities.

[See the latest news](#)

Reports & Downloads

We regularly provide you with [life sciences reports](#) and [publications](#) to download. In our resource center, you can also find all [Biotechgate press releases](#) as well as some detailed [feature tutorials](#).

[Visit our resource center](#)

Database Statistics

The [companies per sector](#) and [companies per country](#) pages give you statistical information on the company clusters listed in our database.

[See the statistics](#)

Contact & Support

We put together [tutorials](#) to help you find your way in Biotechgate. You can [contact us](#) with any question you have or consult our [FAQ](#). For more database specific problems, our [definitions](#) sheet might be helpful.

[See all demos & tutorials](#)

Already familiar with Biotechgate?

Choose another welcome page: [Select](#)

Get started in Biotechgate

Biotechgate General Demo

Go on a short tour within the Biotechgate subscriber section and take a closer look at what search features are available to conduct simple and complex searches as well as manage, comment and share your results with colleagues. The video also gives you an overview of parallel Biotechgate services and information sources.

Want to learn more? [See all demos & tutorials](#)

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Figure 7-16: Main content of the homepage (V2)

The screenshot displays a search interface for 'Products' with the following sections:

- Search Bar:** A text input field with a 'search' button and a link for 'Text search tips >>'.
- Search Scope:** Two checkboxes: 'Search within Medicion Valley only' and 'Search in bookmarks'.
- Continent / Region:** A dropdown menu currently set to 'Europe (2266)'.
- Country / State:** A sub-section with a 'Country' dropdown set to 'All' and a 'State' dropdown set to '-- No country selected --'.
- Availability:** A checked checkbox for 'Available for out-licensing'.
- Type of product / Development phase:** A sub-section with a 'Type of product' dropdown set to 'All' and a 'Phase' dropdown set to '-- No product type selected --'.
- Main sector / Therapeutic sub-sector:** A section with two columns. The left column, 'Main sector / area', contains a list of categories with checkboxes: Cardiovascular, Conditions originating in the perinatal period, Congenital malformations, deformations and chromosomal abnormalities, Digestive system, and Diseases of the blood and blood-forming organs; immune disorders. The right column, 'Therapeutic sub-sector', is currently empty with the text 'No main sector selected'.
- Primary market:** A dropdown menu with options 'GP' and 'Specialty'.
- Molecule type:** A dropdown menu with options 'Antibody', 'Natural / Modified Protein', and 'Other Macromolecule'. It includes the instruction '-- Click to expand menu --'.
- Mode of administration:** A dropdown menu with options 'Injectable', 'Not yet known', and 'Oral'. It includes the instruction '-- Click to expand menu --'.
- Marketing rights available / sought:** A dropdown menu with options 'Africa', 'Australia / New Zealand', and 'Canada'. It includes the instruction '-- Click to expand menu --'.
- Buttons:** 'reset' and 'search' buttons at the bottom.

Figure 7-17: Licensing opportunities (products) search mask (V2)

In the results listing of the results display page, the green-colored buttons indicating (and leading to) what information sections are available in the corresponding company profile were converted into tabs and shifted down to the bottom of the entry (as shown in figure 7-18). The bookmark symbol was also tentatively moved to the right to ensure consistency between the layouts of the results display page and the profile view.

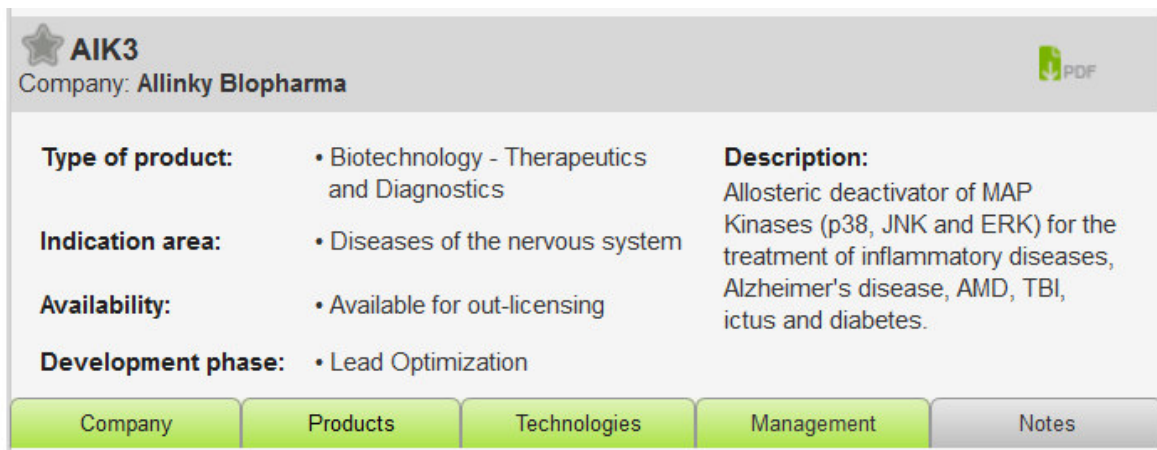


Figure 7-18: Entry from the results display page (V2)

In addition, the “Download as PDF” dialog window was completed by some additional information and the layout was slightly improved (see figure 7-19) by adding the company name. As for profile view, the elements in the header were re-arranged in order to optimize the space used and to make the “Update profile / report a mistake” link more clearly visible (as shown in figure 7-20).

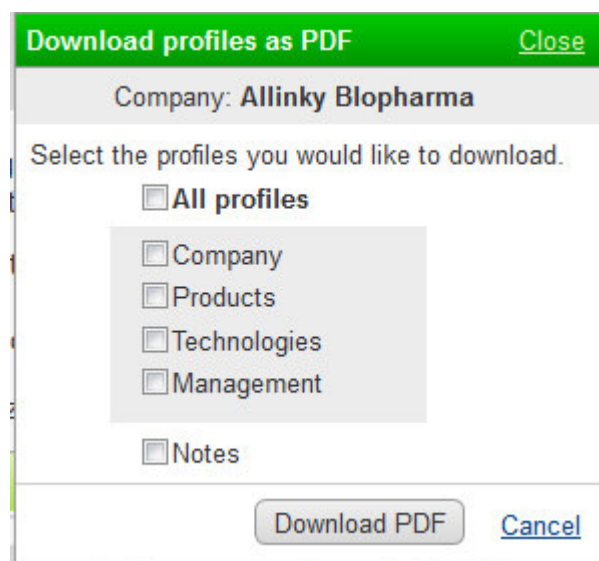


Figure 7-19: Download as PDF dialog window (results display page and profile view, V2)

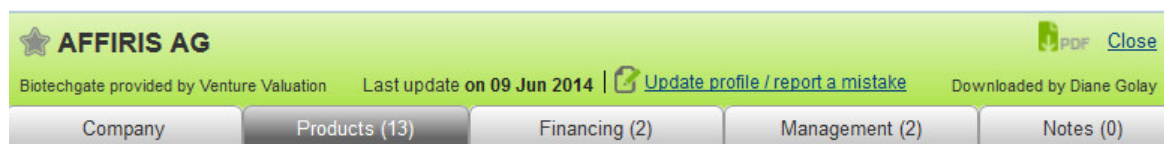


Figure 7-20: Header of the profile view (V2)

7.5.4 Second usability pre-test

This second pre-test took place two days after first one. The evaluator chosen for this pre-test (again from the user pool established in preparation for the final usability test) was not a Biotechgate subscriber and was unfamiliar with the redesign project. The task scenarios used for this test were an updated, tentatively improved version of the ones used in the first pre-test.

The test set-up was slightly modified in comparison with the first pre-test. GoToMeeting²⁷ was again used for reverse screen-sharing and test-recording, but Techmith's Morae²⁸ was replaced by ClickTale²⁹ for mouse tracking. No technical issues occurred during the test.

All test task were understood and performed by the evaluator. Significant design and usability issues were uncovered by this second test. The evaluator pointed out that the main navigation bar was not visible enough, as it was overshadowed by both the welcome banner above the homepage main content section and the *Search* button at the top of the left sidebar, and suggested for the main navigation bar to be lowered and for the Search button the be shifted down to the bottom of the left sidebar. In addition, he found that the button label ("Search") was inappropriate in consideration of the actual contents of the page (an overview of the search-related features available). A further usability issue was uncovered in the profile view, in which both the company-specific and the product-specific bookmark symbol were overlooked by the evaluator.

Apart from the problems mentioned above, the feedback received was mostly positive. The look and feel of the prototype was judged agreeable and in compliance with the visual identity of Biotechgate, and the evaluator was able to find all documents / pages required by the test scenario with the help of the indications and links provided on the homepage. The two last issues identified during the test were, in the left sidebar, missing pages (the respective information pages of the three databases were not included in the prototype) and, in the *Licensing opportunities* search mask, the lack of relation between the *Continent / Region* drop-down list and the *Country* filter list box (see figure 7-21). This latter element was

²⁷ <http://www.gotomeeting.com/online/>. A global description of the software is given in the next chapter.

²⁸ <http://www.techsmith.com/morae.html>

²⁹ <http://www.clicktale.com/>. A global description of the software is given in the next chapter.

in accordance with the current functionality of the Biotechgate search masks; however, the evaluator pointed out that the *Continent / Region* filter was useless without this addition.

The image shows a search interface with two filter sections. The first section, labeled 'Continent / Region', contains a dropdown menu with 'Europe (2266)' selected. The second section, labeled 'Country / State', is a light gray box containing two sub-sections: 'Country' with a dropdown menu showing 'All', and 'State' with a gray button labeled '-- No country selected --'.

Figure 7-21: *Continent / Region* and *Country / State* filters in the *Licensing opportunities* search mask (V2)

7.5.5 *Third functional prototype (V3)*

The basic layout of the page underwent significant modifications. Information pages about the three databases were added to the prototype. In accordance with the current Biotechgate design, the pages in question were made accessible through the database labels in the left sidebar. However, a small arrow symbol and a strong (clearly visible) hover effect were added to the label buttons in question in order to make it clearer that they could be clicked on. The header, comprising the main navigation, was lengthened, and thus given more importance and visibility, while the Search button, originally at the very top of the left sidebar, was shifted down to the very bottom of the same bar and re-labeled “Search guide”, as this term seemed to describe correctly the contents of the page (an overview over the search-related features in the database). These modifications are shown in figure 7-22, along with the *Company database* info page. All information pages of the databases were completed with new content in comparison with the current Biotechgate website: in addition to a general description of the database, boxes introducing the different search masks available were included. This was made in an attempt to support new users in the choice of the most appropriate search mask in consideration of their work assignments.

BIOTECH GATE
GLOBAL DATABASE
Subscriber Section

Home My Account Log off

Search Global Life Science Map Industry News Resource center Biotechgate statistics Contact & Support

Hans-Theodor Weber
[Last visit: 8 Jun 2014]

Home > Search > Company database

Quick companies search search

Company database

- (31'024) Companies
- (37'780) Products
- (3'835) Technologies
- (5'491) Financing rounds
- (463) Company valuations
- (103'907) Management details
- (6'038) Licensing opportunities

Deals database

- (1'631) Deals

Investor database

- Investors

Search Guide

Company Database

Your source for life sciences company information

The company database contains over **31'000 profiles of companies** all around the world. In addition to providing **general company information** (including contact details, corporate description and number of employees), it also gives access to **products pipelines and descriptions** as well as to **information on technologies**. Detailed indications on **companies' financing rounds and valuations** are available in the financing profile. Information on **company deals** is also accessible. Furthermore, the management profile provides information on the **people involved with the company and its management**. Companies can also fill in a "looking for" profile, allowing them to promote **job and licensing opportunities**.

Search the company database

Search for companies

The companies search mask enables you to narrow your company search down through various filters including region, sector, therapeutic area, financing details and business model.
[Search now](#)

Search for products

The products search mask contains a variety of product-related filters, including type, therapeutic area, development phase and availability. Other advanced filters include molecule type and mode of administration.
[Search now](#)

Search for technologies

The technologies search mask makes it possible to filter technologies by region, availability, area (field) and sought marketing rights.
[Search now](#)

Search for financing rounds

The financing rounds search mask contains different financing-specific filters, among others series / round and financing type. It is also possible to select a specific round sum range.
[Search now](#)

Search for company valuations

The company valuations search mask is similar to the financing rounds mask, but only the profiles containing a valuation are searched.
[Search now](#)

Search for management details

The management details search mask enables to filter your search by company region and the type(s) of position sought.
[Search now](#)

Search for licensing opportunities

Two licensing opportunities search masks are available: products technologies. In both cases, the masks are similar to their parent, at the difference that the option "available for out-licensing" is pre-selected.
[Search now](#)

New to Biotechgate? Take a look at our [Search Guide](#).

[Back to top](#)

Saved Searches

You have **1 saved searches**. Click on a link to load a saved search.
[Learn more about this feature](#)

Cosmetics Companies (EU)

Bookmarks & Notes

- Bookmarks**
 - Companies (1)
 - Products
 - Management
- Notes**
 - All notes
 - Profiles with notes

[Learn more about this feature](#)

Partner Section

- Statistics download**
 - Company stats
 - Company stats archive
 - Pipeline & financing rounds
 - Indication matrix
- Profile download**
- News**
 - Add news
 - Edit my news
 - See all news
- Information**
 - API Documentation
 - Users' guides

[Learn more about this feature](#)

Latest updates

13 June 2014

- Targeted Cell Therapies, LLC
- Sound Pharmaceuticals, LLC
- CrispTek, LLC
- J.A.R. Pharmaceuticals, Ltd.
- MicroLeman

Updates within the latest 30 days:

- 1'792 Company profiles
- 873 Products
- 68 Technologies
- 160 Financing rounds
- 3'219 Management details

Search
Companies
Products
Technologies
Financing rounds
Company Valuations
Management details
Licensing opportunities
Deals
Investors

Global Life Science Map

Industry News
Industry News
Biotech Financing Summary
Life Science Jobs
Life Science Conferences
Life Science Events

Resource Center
Features & Support
Life Sciences Report
Press releases
Publications & News

Biotechgate Statistics
Companies per sector
Companies per country

Contact & Support
Add / Update company
Add event
Definitions
FAQ
Contact & Impressum

My Account
My Profile
Subscriptions
Update Credit Card
Upgrade

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Figure 7-22: Information page about the Company database (V3)

In keeping with those changes these changes, the main navigation was slightly modified. Figure 7-23 shows menu categories and options were affected by these modifications.

ID	Pate Title / Content Area	Type	Summary & Comments
0	Homepage	Start Screen	Overview over the Biotechgate features (in accordance with the different categories / menus of the main navigation)
1	Search		==> Leads directly to the overview over the search-related features
	Company database	Info page	
	Licensing deals database	Info page	
	Investors database	Info page	
2	Global Life Science Map	Map Search	See http://www.biotechgate.com/gate/v3/companies.php?info=global_map
3	Industry News		http://www.biotechgate.com/gate/v3/news.php
3.1	Industry News		
3.2	Biotechgate Financing Summary	Download page	Biotech Financing Summary, see http://www.biotechgate.com/gate/v3/statistics.php?info=vcdeal
3.3	Life Science Conferences		http://www.biotechgate.com/gate/v3/events.php
3.4	Life Science Jobs		http://www.biotechgate.com/gate/v3/jobs_overview.php
4	Resource Center		
	Biotechgate Tutorials	RS Category	
	Life Sciences Reports	RS Category	http://resourcecenter.biotechgate.com/category/reports/#sthash.gn5m5uJv.dpbs
	Biotechgate Press Releases	RS Category	http://resourcecenter.biotechgate.com/category/press-releases/#sthash.tGFdIRqN.dpbs
	Biotechgate Publications & News	RS Category	http://resourcecenter.biotechgate.com/category/publications/#sthash.7cKold2i.dpbs
5	Biotechgate Statistics		
	Companies by Sector		http://www.biotechgate.com/gate/v3/statistics.php?info=statistics
	Companies by Country		http://www.biotechgate.com/gate/v3/statistics.php?info=countries
6	Contact & Support		
	Add / Update Company		http://biotechgate.com/gate/v3/add_company.php
	Add Event		http://biotechgate.com/gate/v3/event_info.php
	Search guide		Overview over the search-related features in the database
	Definitions		http://biotechgate.com/gate/v3/faq.php
	FAQ		http://biotechgate.com/gate/v3/faq.php
	Contact & Impressum		http://www.biotechgate.com/gate/v3/contact.php

Figure 7-23: Main navigation of the new subscriber section (V3)

Further, smaller changes included the creation of a relation between the *Continent / Region* and the *Country* filters in the existing search masks (as shown in figure 7-24) and the coloration of the bookmark symbols in the results display page and in the profile view from grey to green (see figure 7-25), in an attempt to make them more visible.

Continent / Region

Country / State

Country	State
Countries in Europe	-- No country selected --
<input type="checkbox"/> Austria (366)	
<input type="checkbox"/> Belgium (322)	
<input type="checkbox"/> Croatia (63)	
<input type="checkbox"/> Cyprus (15)	

Figure 7-24: Continent / Region and Country / State filters (Licensing opportunities search mask, V3)



Figure 7-25: Product-specific bookmark symbol (profile view, V3)

Finally, the *Download results as PDF* feature on the results display page was improved by adding a dialog window allowing the users to select the profiles he really wants to download (see figure 7-26). This addition was inspired by the *Print* dialog window of the EBL³⁰ website (shown in figure 7-27).

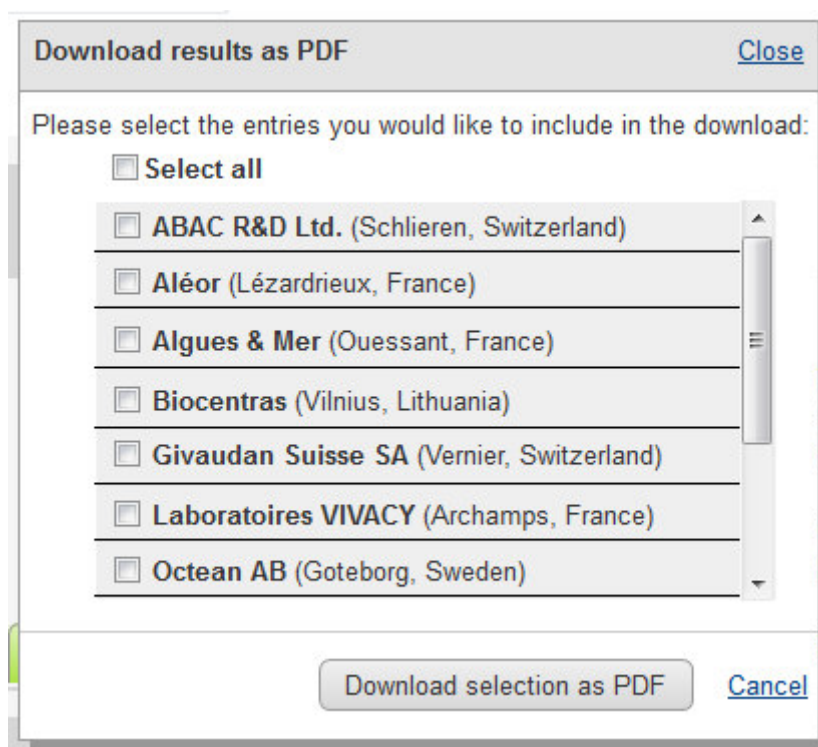


Figure 7-26: Dialog window of the Download results as PDF feature (V4)

³⁰ <http://www.chur.ebib.com.ezproxy.fh-htwchur.ch/patron/Default.aspx>

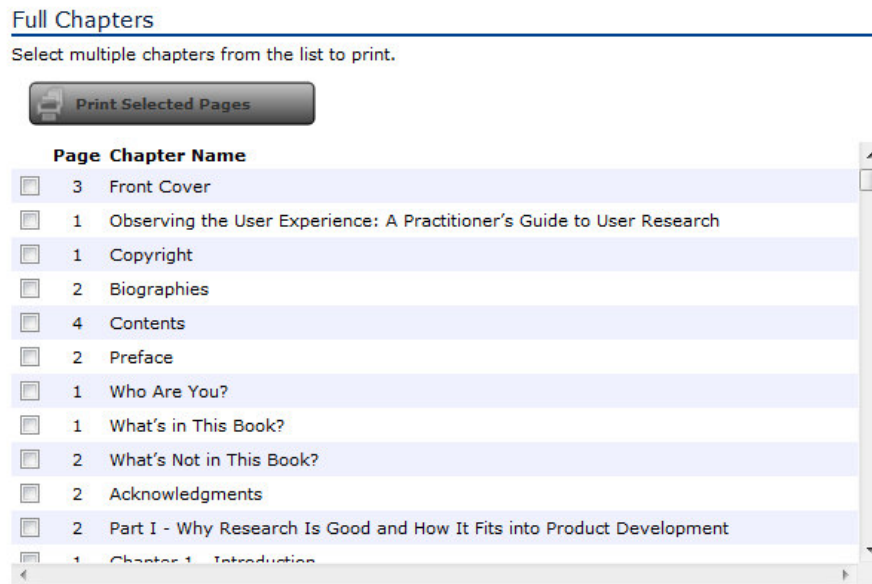


Figure 7-27: Print dialog window displayed on the EBL website

7.5.6 Fourth functional prototype (V4)

In preparation for the final usability tests, the prototype was completed with the *Companies* search mask (as well as a corresponding results display page) and the *Company* and *Management* information sections of the company profile. However, since no negative feedback or suggestion for improvement had been received on the *Company* information section, its addition to the prototype was considered a mere formality, and no significant modifications were made.

The screenshot displays a search interface for companies. At the top, there is a search input field and a green 'search' button. Below the search field is a link for 'Text search tips >>'. Three checkboxes are listed: 'Search within Medicon Valley only', 'Search in bookmarks', and 'Limit results to entries including specific profiles (check to show profiles list)'. Below these are two input fields: 'Company name' and 'Continent / Region' (set to 'All regions'). A section titled 'Country / State' contains two columns: 'Country' and 'State'. The 'Country' column has a list of countries with checkboxes and counts: Algeria (4), Argentina (17), Australia (291), and Austria (366). The 'State' column shows '- - No country selected - -'. Below this is a section titled 'Main sector / Subsector' with a link to 'definitions sheet'. It contains two columns: 'Main sector' and 'Subsector'. The 'Main sector' column has a list of sectors with checkboxes: 'Biotechnology - Therapeutics & Diagnostics', 'Biotechnology - R&D Services', and 'Biotechnology - Other'. The 'Subsector' column shows '- - No main sector selected - -'.

Figure 7-28: *Companies* search mask (V4)

The *Companies* search mask (shown in figure 7-28) was redesigned after the model of the *Licensing opportunities* search mask. The boldest change made to the current design was the combination of the *Products* filter with the *Profiles including* checkboxes (as shown in figure 7-29) and their shifting up from the bottom to the top of the search mask in the form of one single checkbox. This modification was of experimental nature: the idea was to see if being at the top of the mask made sense to the users and made the feature more visible.

Search within Medicin Valley only
 Search in bookmarks
 Limit results to entries including specific profiles
 (check to show profiles list)

All profiles

- Products
 - available for out-licensing

Biotech	Medtech
<input checked="" type="checkbox"/> Preclinical	<input checked="" type="checkbox"/> In development
<input checked="" type="checkbox"/> Phase I	<input checked="" type="checkbox"/> On the market
<input checked="" type="checkbox"/> Phase II	
<input checked="" type="checkbox"/> Phase III	
<input checked="" type="checkbox"/> On the market	

Technologies
 Financing rounds
 Valuations
 Management details
 Licensing deals

Profiles with notes
 Type of relationship:

Figure 7-29: Filter allowing to reduce the list of the search results to company profiles comprising specific information (sections) (V4)

The Management information section of the company profile was designed on the basis of an informal specification document provided by Venture Valuation. The idea was to use anchors like in the *Products* information section, allowing the user to click on a name to access detailed information on the selected person. It was attempted to find a design that could be clearly arranged even if the optional fields were not filled in.

7.5.7 Prototyping for remote usability testing

The two first moderated remote pre-tests showed that several elements needed to be considered and steps taken when preparing a prototype for usability testing. In the case of remote asynchronous testing (planned for some of the final usability tests), the elements in question were considered to be even more significant, for the users would be left to themselves and could be prone to abandon a task more quickly should a broken link, a missing page or further dysfunctions interfere with performing the task in question. As such, it was felt necessary to optimize the scope and capabilities of the prototype in view of the official usability-testing phase, in order to ensure as representative as possible data-gathering on the “true” behavior of the Biotechgate users.

Changes were made in light of the observations made during the two pre-tests and an article by Jim Ross (2012), a user experience specialist and practitioner, providing tips on what to do – or avoid – when conducting usability tests on prototypes. The following list provides a “retrospective” of the modifications made to the prototype in preparation for the (remote) usability tests (regardless of the development stage at which they are conducted):

- All dummy, *Lorem ipsum* text was replaced with realistic informative paragraphs such as the ones the concept presupposed (Ross 2012);
- Pages originally not requiring to be included in the prototype were created in order to reduce the number of dead ends the evaluator would or could encounter (especially when testing the main navigation);
- The results display page was filled with real entries corresponding to the search query chosen for the test scenario (since there were two test scenarios with two different queries, two different results lists were made, namely one for each scenario), and each entry was filled with real data (Ross 2012);
- A green textbox (tooltip) shortly explaining what the function would normally do was added to the features leading to a form or page not included in the prototype, most notably to the “Update profile / Report a mistake” link within the profile view, since it was included in the test scenario³¹;
- Where features could not be added or “made functional” with reasonable effort, the feature was not mentioned, in order to avoid confusing the user (an example of this measure is the disappearance of the “click to expand” link on certain filter menus in the search masks, their addition being extremely time-consuming and their importance being rather low);
- Tooltips were added to all symbols or functions visible in the prototype that required them, so as to make it possible for the user to get information on a specific feature without needing to be at the precise location on the page where he was supposed to find it;
- For the same reasons, features that were repeated several times on a page, typically like the “Download as PDF” function on the results display page, were made functional (or rather pseudo-functional, since no download was actually triggered) at every location, meaning that the corresponding dialog window appeared with the correct parameters no matter what entry the user chose;
- It was made sure that all links leading to existing pages were functional;

³¹ This particular addition was made in view of the automated tests, since that kind of explanations could be given orally to the evaluators during the moderated tests.

- Specific links, buttons and symbols were programmed so as to trigger a page refresh and / or the addition of case-specific variables in the URL of the page to be refreshed / loaded in order to enable the identification of the button having been clicked by the user³².

In summary, the prototype was made to look as real as possible and to be as interactive as possible, in order to provide the evaluators with the most realistic experience possible considering the limitations of the prototype. However, not all companies or products listed in the two results display pages mentioned earlier were provided with a company profile, and not all information sections were incorporated into the company profiles included in the prototype, because it was felt that unavailable information would not confuse the user as much as the presence of seemingly “useless” features.

³² These modifications were conducted in preparation for the automated tests in consideration of the technical limitations of the Loop11, the program chosen for those tests (more on that topic is available in chapter 9.5.4).

8 Remote Usability Testing

8.1 Goals and Research Questions

In consideration of the work that had been done, the main goal of the usability tests was to check if all the usability-related issues mentioned during the interviews (see chapter 6.6) had been solved within the new design concept, respectively to verify that the requirements and usability goals set for the new concept were effectively fulfilled by the redesign, and to find out what components or features needed further improvement. In accordance with this general objective, the main questions that had to be answered in the tests were the following:

- Does the redesign fulfill the general requirements and usability goals set?
- Do the components and features added to the interface and their functionality correspond to the users' needs and expectations?
- What problems and / or difficulties do the users encounter while performing typical tasks within the new interface?
- Through what changes can the issues encountered by the users be solved?

8.2 Methodology Overview

Taking into account the very specialized and life science-specific nature of the Biotechgate database and its contents, conducting the usability evaluations with real (potential) end users of the portal was considered a key factor in the success of the usability-testing phase of the project. In this context, a remote testing set-up was, for practical, financial as well as quality- and representativeness-related reasons, a logical choice. Remote usability testing made it possible for the interface to be evaluated by current and / or potential users of Biotechgate from different countries, cultures and educational backgrounds, despite the limited financial resources and short duration of the project, thus reducing the danger of creating an interface that corresponded to the specific needs of only a small, local group of Biotechgate end users and neglecting to consider the variety of profiles within the target group of the database.

Unlike in the preliminary usability-testing phase (see chapter 7), the RITE method was not used within the framework of this final testing phase, mainly because of the small number of evaluators recruited and the time lapse between each single test, which made it impossible to get representative results within a short enough time. The high time commitment presupposed by the method chosen for the revision of the prototype following the identification of issues was also a significant obstacle at this particular stage of the thesis. Moreover, the impossibility of modifying the automated tests once launched³³, which could have become necessary depending on the changes made to the prototype to ensure the

³³ More indications are given on the tool used for the automated tests in chapter 9.5.4.

correspondence between moderated and automated tests, was an additional non-negligible impediment to the application of the RITE methodology.

The primary method used was moderated (synchronous) remote usability testing. However, since such tests are (like traditional lab-tests) time intensive and therefore have a limited reach (fewer users generally evaluate the interface), it was decided to use asynchronous testing as a complement (as recommended by Barnum 2010: if automated tests generate less qualitative data than moderated ones, they typically have the advantage of being able to be conducted with more users and deliver metrics on the tested components and features, thus increasing the confidence in the findings as well as the representativeness of the results (Barnum 2010, pp. 44-45 and p. 48)). Representativeness was considered an important factor at this stage, for it had been neglected in the user needs assessment phase and the time available to further optimize the concept was limited. Therefore, the ability of distinguishing between general usability problems requiring immediate solving and more user-specific issues whose potential modification could be postponed to a next usability study was essential.

In view of the numerous changes that had been made to the interface in the new concept, the different features and elements affected by these changes were prioritized prior to the creation of the test tasks, so as to guarantee the drafting of a test scenario that covered all crucial elements. Because of the time limit fixed for the moderated evaluation and the type of features to be tested, two variants of one same global test scenario were developed for the moderated tests. Such an approach made it possible to have the features common to all users, such as the homepage, the main navigation and the results list, tested by all evaluators, while the more profile-specific components, namely the search masks and the different information sections of the profile view, could be evaluated separately by different evaluator groups. A downside of this approach was the need for more evaluators³⁴. One of the two variants of the moderated test scenario built the basis of the automated tests as well, since their role was above all to emphasize the most important elements in need of improvement among the issues and comments mentioned in the moderated tests, and not necessarily to uncover new usability issues.

The moderated and automated tests were both scheduled to start on the same day and spread over a two-week period; the two-week duration was set due to the unavailability of several evaluators during the originally single week planned for the moderated tests. However, due to an unexpected delay in the recruitment of evaluators, the first automated tests did not take place until the end of the first week, despite the test set-up being launched on the schedule.

³⁴ The topic of the number of evaluators needed / recruited is addressed more in detail chapter 9.4.2.

8.3 Evaluator profiles

Different user profiles had to be represented among the evaluators. The primary distinction made was between current and potential Biotechgate users. It was considered important to gather feedback from both these user groups, since they could provide complementary input on the usability of the prototype (the current users being potentially influenced by their knowledge of the current database, yet able to indicate if they notice an improvement between the old and the new design, and the potential users bringing a fresh perspective on the whole concept). The secondary distinction was made between users primarily interested in companies and users primarily interested in products, in accordance with the two test variants available. This secondary differentiation was applied to the moderated tests only, because all current and potential Biotechgate users were considered able to perform the tasks of both test variants, even if the scenario suggested did not exactly correspond to their (potential) use of the database.

8.4 Moderated Tests

8.4.1 Specific goals and research questions

The purpose of the moderated tests was to gather primarily qualitative data on the usability of the prototype, including the reason(s) why the evaluators failed to successfully complete a task, and, where possible, to collect clear, or rather concrete, suggestions for improvement. The moderated tests were to provide the data necessary to understand actual user behavior and, by extension, to interpret the results of the automated tests. As the primary usability-testing and data-gathering method, the synchronous tests were also expected to uncover the majority of the usability issues within the prototype, among which the ones most in need of improvement would be identified thanks to the automated tests. The moderated tests consequently had to answer the following questions:

- What tasks do the evaluators fail to complete successfully and why?
- What layout or functionality-related elements affect the usability of the prototype?
- How can the interface be modified so as to better fit the evaluators' expectations and needs?

8.4.2 Recruiting

The number of evaluators needed for the moderated tests was fixed on the basis of earlier research and best practice in the field. Nielsen (2000) recommends conducting smaller, iterative tests with 5 users each, arguing that between 80% and 85% of all usability issues will be uncovered by those users (Nielsen 2000; Barnum 2010, p. 16). Even though no follow-up test or study could be planned during the thesis project, which theoretically required

a larger usability test, it was decided to conduct only a small moderated study, since the results would be complemented by a larger number of automated tests. For the case at hand, within the framework of which two different test variants, respectively two different user profiles, were to be tested, the indication was to recruit 3 to 4 users per test version. The motivation for this was the possible overlap between the different variants (Nielsen 2000). This brought the minimal number of evaluators required to 6. Taking into account possible no-shows (Goodman et al. 2012, pp. 278-279; Barnum 2010, p. 161), it was decided to recruit 8 to 10 evaluators for the moderated tests.

The three Biotechgate users that were recruited for the interviews within the framework of the user needs assessment were all invited to participate in the usability testing phase as well, for it was felt that they could give valuable input on whether the issues they mentioned had been resolved as they expected it. Their willingness to participate in the usability tests was ascertained during the interviews in question, and they were as such an exception in the recruiting process. All other participants were recruited through Venture Valuation on the basis of information provided by the author on the number of testers (since the interviewees were included in the count, the company was asked to recruit only 4 to 6 additional evaluators for the moderated tests) and on the user profiles (current as well as potential Biotechgate users) required.

The recruiting process for the moderated tests through Venture Valuation took place during the user needs assessment phase, several weeks before the tests were scheduled to take place. Potential evaluators were contacted by the company and, upon their agreeing to participate in the project, their contact details were transmitted to the test moderator. The test incentive was fixed by Venture Valuation and constituted a one-month free subscription to Biotechgate. Each test date and time was then scheduled directly with the evaluators one to two weeks prior to the original time frame set for the tests³⁵. All communication related to the test was made per e-mail.

For the 4 evaluators recruited by Biotechgate, three tests could be scheduled and conducted, bringing the total number of moderated usability tests (including moderated pre-tests) to the minimum of 6 required (three men and three women), among them 3 current users (the interviewees from the user needs assessment phase³⁶) and 3 potential users. Finally, 2 users (one current user and one potential user) participated in the pre-tests, and 4 (two current users and two potential users) participated in the “official”, final usability tests.

³⁵ Like it was mentioned in the previously, the duration of the usability testing phase had to be prolonged because of the unavailability of certain evaluators within the planned time frame.

³⁶ An no-show in the user research phase was the reason why only three instead of the four current Biotechgate users planned were recruited for the moderated usability tests.

8.4.3 Test design

The moderated tests consisted in a formal usability test and a semi-structured interview dedicated to a more global evaluation of the prototype by the evaluators in consideration of the tasks performed.

Since numerous features and elements affected by the changes made to the interface needed to be tested, the most significant features and changes made in the redesign were prioritized after the method described by Goodman et al. (2012, pp. 281-282) prior to any test task being drafted, so as to make sure that all essential elements were covered by the test scenario. The result of the feature prioritization exercise is shown in figure 8-1.

On the basis of the feature list resulting from this feature prioritization exercise, test tasks were drafted. It was decided to limit the number of test tasks to a maximum of 15, so as for the usability test to last between 20 and 30 minutes and to bring the whole moderated evaluation to a maximum of one hour, thus leaving a time frame of up to half an hour for the interview following the test. This one-hour limitation was set in consideration of the generally busy schedule of Biotechgate users, as it was felt that a longer duration would “scare off” potential testers, for whom a 90-minute test (the maximal duration for a moderated usability test given by Goodman et al. (2012, p. 281)) could have posed too much of an inconvenience.

These time constraints and the type of features to be tested made it necessary to create two variants of one basic test scenario, each composed of a similar structure and containing a common core set of tasks, but each fitted to a specific type of use of the database. This allowed not only for more features to be tested and redundancies in tasks and questions to be avoided, but was also faithful to the user scheme resulting from the interviews with, on the one hand, the users primarily interested in companies, who use the companies search mask and look at the general “company” profile and, on the other side, the users primarily interested in (searching by) products, who use the “products” or the “licensing opportunities” search mask and typically look at the “products” profile. The table 8-1 gives an overview over the tasks composing both test scenario variants.

Feature / Change	Importance (1-5)	Doubt (1-5)	Total
Results list - profile tabs (links to the different profiles available)	5	5	25
Main navigation - Resource Center (categories display in submenu)	5	4	20
Search navigation - overview page (overview over search-related features)	5	4	20
Management profile - anchors (links to detailed person profile)	4	5	20
Main navigation - Biotech Financing Summary (under Industry News)	4	4	16
Information pages about the different databases (company database, deals database, investors database)	4	4	16
Companies search mask - Help finding sub-sectors	4	4	16
Results list - Download full or single profiles as PDF feature (as replacement of the "print" feature)	4	4	16
All profiles - Update profile / report mistake link	4	4	16
All search masks - "Activation" indication of filter menus when sub-filter options available	5	3	15
Results list - Print overview as PDF feature (selecting entries in dialog window)	3	5	15
Homepage - Informational content (presentation of the different contents of Biotechgate)	5	3	15
All Profiles - Company bookmark feature	3	4	12
Main navigation - Contact & Support (new category)	5	2	10
Management & products profile - Bookmarking specific items opening product description (when clicking on the header, it opens directly on the product)	2	5	10
Main navigation - Biotechgate Statistics (new category)	3	3	9
company bookmark symbol (profile view)	3	3	9
All profiles - Download full or single profiles as PDF feature (as replacement of the "print" feature)	4	2	8
Results list - Bookmark symbol (profile overview, management & products)	3	2	6
Results list - Create e-mail alert	3	2	6
Results list - Order By menu (Mix of Order By menu and sort direction)	2	3	6
Results list - Select number of entries per page (dropdown list)	2	2	4
Products profile - Anchors (links to the detailed product description)	3	1	3

Figure 8-1: Result of the features prioritization exercise as described by Goodman et al. (2012, pp. 282-283). This feature list played an essential role in the drafting of the two variants of the test scenario.

	Variant 1 – Licensing Opportunities search mask and products profile	Variant 2 – Companies search mask and management profile
1	Exploring the website.	
2	Finding the Biotech Financing Summary	
3	Finding the UK Trends Analysis 2013	
4	Finding information on the company database	
5	Finding information on the search-related features	
6	Searching for products able to treat the Alzheimer's disease and being in a specific development phase (discovery, lead optimization or preclinical)	Searching for European cosmetics companies whose profile contains at the very least information on their products and their management
7	Ordering the results by product in alphabetical order.	Ordering the search results by city in alphabetical order.
8	Showing all search results on one single page	
9	Identifying the information available on one specific company	
10	Finding the detailed description of a specific product (products profile)	Finding the detailed view of a specific manager's profile (management profile)
11	Bookmarking a specific product	Bookmarking a specific company
12	Reporting a mistake (profile view)	
13	Printing the whole results list	
14	Creating an e-mail alert	
15	Logging off of Biotechgate	

Table 8-1: Overview over the 15 tasks composing the moderated tests for the two test variants (final version).

As recommended by several usability testing handbooks (Goodman et al. 2012, p. 283; Barnum 2010, p. 128), each test task was put into the context of a specific scenario. In doing so, it was attempted to stay as close as possible to the descriptions of their work assignments of the interviewees from the user needs assessment phase. The contextualization of the tasks was expected to increase the credibility of the tasks to the users and bring them to identify more easily with the given assignments. One variant of the test scenario was pre-tested twice within the framework of the pre-tests that took place during the (first) prototyping phase. The final task list (figure 8-1) and task scenarios were created after the second pre-test.

8.4.4 Tools and set-up

The moderated tests were conducted via reverse screen sharing³⁷, a set-up described by Bolt and Tulathimutte (2011, pp. 380-383). Reverse screen sharing presented several advantages compared to “traditional” screen sharing: the interface being opened on the moderator’s computer, it allowed him to control the technical environment used for the test (for example the web browser) and to intervene should problems during the test make it necessary (such as evaluator’s disorientation or task abandon. In addition, the ability to control the prototype was also useful for the interview closing the moderated evaluation, for it allowed the moderator to lead the evaluator to specific pages, components or features and as such to structure the discussion on the basis of his observations during the test, in the event that the evaluator should not address an element spontaneously.

The primary (reverse) screen-sharing tool chosen for the moderated evaluations was GoToMeeting³⁸, a web-conferencing software with, in addition to other remote conferencing features, a built-in recording function, which made it possible to record directly and in good quality the moderator’s shared screen as well as the conversation between moderator and evaluator. However, the software required the evaluator to download a small launch file for him to be able to join the moderator in the virtual conference room set-up.

Skype³⁹ was chosen as back-up screen-sharing program in the event that technical difficulties should prevent the test to be conducted with GoToMeeting or that the evaluator should be unable or even refuse to download the file necessary to launch the software. Even though Skype does not allow reverse screen-sharing, its popularity (all evaluators had a Skype account) made it the most obvious back-up tool, since it was felt that it would be irritating for the evaluators to have to download several programs for a single usability test. An inconvenience of using Skype was however the necessity for the evaluators to share their screen with the moderator, which could be felt as invasive. Furthermore, it prevented the moderator from actively intervening during the test or the interview, should it be needed. Skype audio and screen-sharing sessions were recorded with Evaer⁴⁰.

Mouse tracking was used as complementary data-gathering method and replacement for eye-tracking (often used in traditional laboratory-based usability tests (Greifeneder 2011, p. 82)), with the goal of identifying “attention patterns” in the interaction of the evaluators with the interface, so as to better understand their perception of the elements and the information

³⁷ The expression “reverse screen sharing” describes a set-up that consists in not only sharing one’s screen with the interlocutor(s), but also giving him (or them) the control over one’s mouse and keyboard, thus allowing them to interact with the shown interface as if it were open on his (or their) own computer.

³⁸ <http://www.gotomeeting.com/online/>. The free GoToMeeting trial, granting a one-month access to all GoToMeeting features, could be used for the tests.

³⁹ <http://www.skype.com/fr/>

⁴⁰ See a detailed description of Evaer in chapter 6.5.

displayed as well as their expectations concerning the (re)location of the features addressed by the test. As such, mouse tracking was expected to deliver implicit information on the users' needs and expectations that the evaluators might be unable to formulate explicitly during the evaluation.

Mouse moves and clickstreams were recorded with ClickTale, a program originally developed for recording the behavior of random visitors of a website in order to evaluate its usability and uncover issues in its design. On the basis of the recorded data, Clicktale creates heat maps that can be customized by the user, for example through the definition of a specific data range for the data to be included in the map. ClickTale also possesses a live recording function that records all visitors' interactions with the different pages of the website, allowing the analyst to "watch" the visitor using the website (much like screen-recording). In consideration of the project-specific needs, this feature was considered as particularly valuable, because the recordings made of the evaluators' interactions with the prototype could be used as back-ups should technical problems prevent GoToMeeting (or Skype) to record the screen-sharing session or make the file unusable. However, an inconvenience of using Clicktale was the necessity for JavaScript code to be included at the top and at the bottom of each HTML page of the website.

Clicktale is available for free with some feature and page view limitations; the recording feature, or more specifically the option of watching the recordings made of the website, is for example accessible only to fee-paying users. However, the ClickTale team granted the author a one-month full access to the program's features for free.

The HTML pages of the prototype were generated by Axure, the tool used to develop the prototype⁴¹, and the JavaScript code given by ClickTale was then added to each generated HTML page before uploading all prototype-related files on a private web domain. Each evaluator was sent the test instructions in PDF and a link to the virtual conference room generated by GoToMeeting per mail the day before he was scheduled to do the test. The evaluators were asked to print out the instructions before the meeting.

8.4.5 Results

8.4.5.1 General remarks and impressions

The feedback on the layout, appearance and global usability of the prototype was mostly positive. Of the six evaluators who tested the prototype (incl. the pre-tests), three judged the usability of the site as good, two as very good but not excellent and one as excellent. The users who were already familiar with Biotechgate recognized the visual identity of the company and indicated they were satisfied to find all the core elements they were familiar

⁴¹ See chapter 8.3.

with, such as the shortcuts to the different search masks on the left, the sidebar on the right and the main navigation at the top. Most users were also happy with the colors of the website, and especially with the use of those colors to differentiate certain interface components, which they found helped them recognize the information structure of the site. However, one evaluator pointed out that the colors used in the left sidebar (shown in figure 8-2) might be considered as too feminine by the target audience of Biotechgate, consisting mostly of men (since there are more men than women active in the field of the life sciences).

In addition, some users had difficulty figuring out that the buttons comprised in this left sidebar were actually shortcuts to the different search masks available.

All users described the pages of the prototype as quite “busy”, which could be a little overwhelming at first. However, they also all indicated that such an issue was to be expected in a database, and that they were happy with the information available on the different pages. As such, they seemed to consider the “overload” of the pages with information as a “necessary evil” that they were prepared to tolerate.

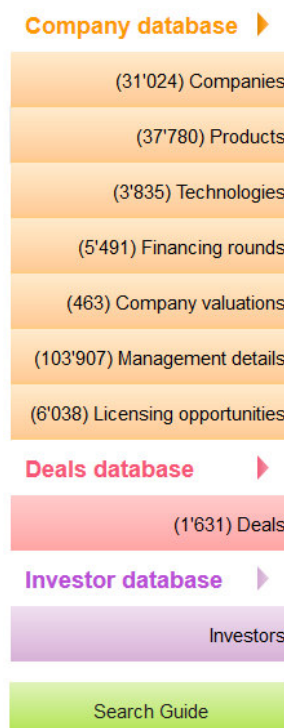


Figure 8-2: Left sidebar of the prototype used in the official usability-testing phase

Nevertheless, a fundamental finding of the test was the existence of two kinds of Biotechgate users: the ones who sought to gain knowledge of the database before actually using it, and the ones valuing a more pragmatic approach who wanted to be able to “learn by doing”, without having to look at any tutorial or explanation before having a concrete experience with

Biotechgate. This was an essential finding, since both groups had very different requirements, needs and expectations regarding the website, the first user group being rather satisfied with the current information pages, and the second one needing more and better context-sensitive help.

8.4.5.2 Main Navigation

Almost all users had difficulty finding the Biotech Financing Summary, most of them expecting it to be in the Resource Center, but located the document on their second try. As such, it is difficult to determine if the Financing Summary should stay in the “Industry News” category (as shown in figure 8-3) or move to the Resource Center, although its integration into the Resource Center seems to correspond to the expectations of the majority of users.



Figure 8-3: Location of the Biotech Financing Summary within the main navigation in the prototype used for the official usability-testing phase

On the other hand, all users easily located the “UK Trend Analysis 2014” in the “Life Science Reports” category of the Resource Center. However, in most cases, the users had encountered it while looking for the Biotech Financing Summary, which makes it impossible to determine the reliability of this result.

One of the evaluators suggested adding the latest reports and articles published to the “Latest updates” box in the right sidebar in order to make the new downloads available more noticeable.

8.4.5.3 Homepage

The feedback on the homepage was predominantly positive. Several users expressed their satisfaction with the overview over the different features available in Biotechgate. The boxes and their content were generally noticed by the users, although most of them only read the titles and not the text contained in the different boxes. Few users scrolled to the bottom of the page. Nevertheless, the boxes proved to be helpful to the users on different occasions, and several users used the links provided in the boxes to navigate to another page instead of using the main navigation bar. Throughout the test, some users also went back to the homepage to try and find information on what their next steps could be. As such, the page seemed to fulfill the “reference” role for which it was designed. However, some users complained about not finding a link to the “Companies” search mask in the “Database search” box.

The heat map of the homepage generated by ClickTale (see figure 8-4 below) shows in more detail what elements / components the attention of the four evaluators was drawn to. Among the general components of the design, the navigation options located at the top right corner seems to be the most noticeable one. Among the main content of the homepage, the Biotechgate features overview receive the expected attention, which suggests that this box-based display is effective.

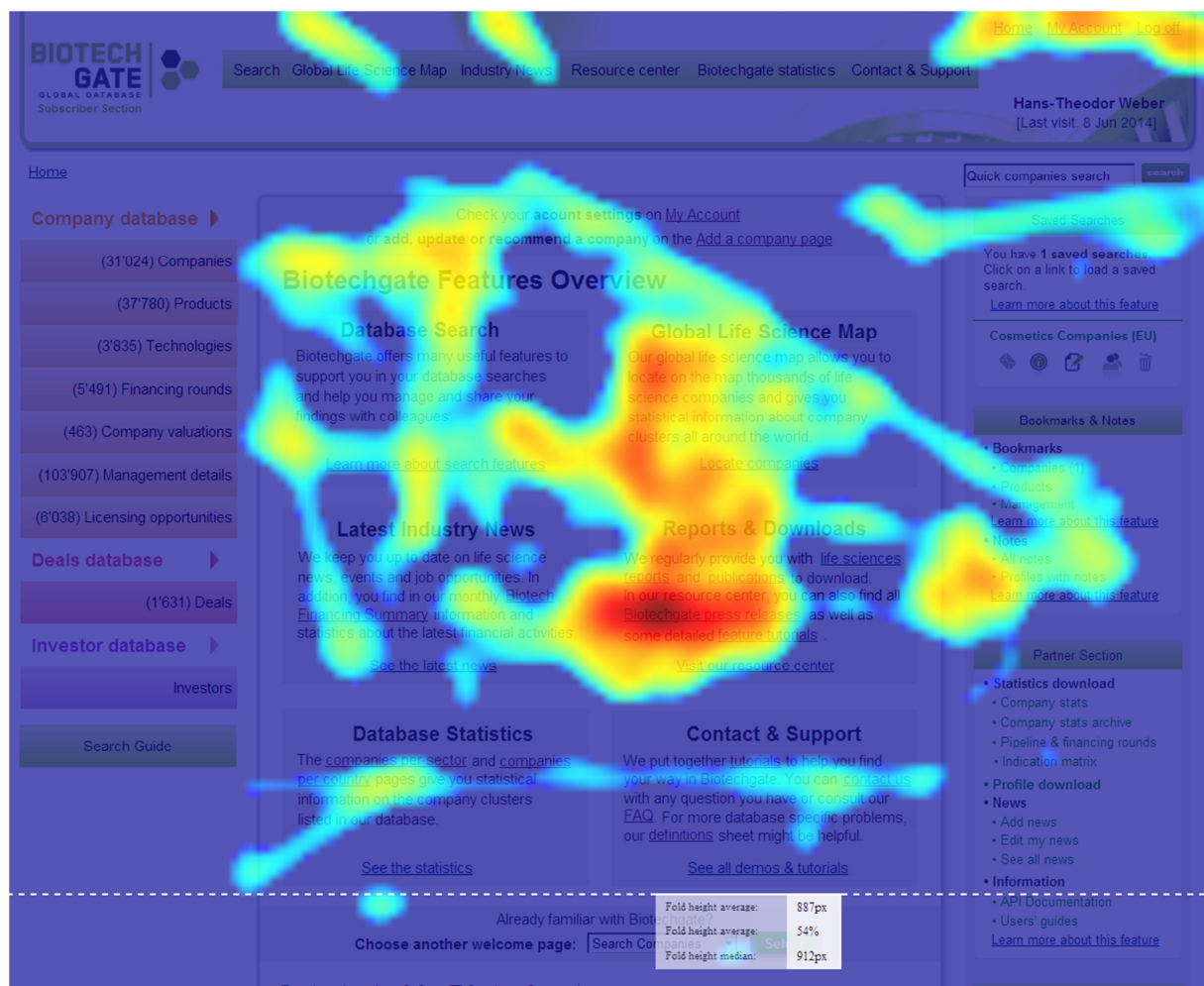


Figure 8-4: Heat map of the homepage of the prototype used in the official usability-testing phase generated by ClickTale.

8.4.5.4 Search guide

All users easily located the page and declared they were happy with the look and the contents of the search guide. Several of them mentioned that they found such a features overview was useful.

8.4.5.5 “Companies” search mask

The most significant issue in this search mask was the location of the filters meant to limit the number of results to company profiles comprising specific information sections (figure 8-5). All users expected it at the bottom of the page, generally with the advanced filters.

Database > Companies

Figure 8-5: Checkbox allowing to filter results on the basis of the available information sections of the company profile (here marked with a red border).

Another problem was the link to the “Definitions” sheet shown in figure 8-6, which none of the evaluators used, even if they were not familiar with the categorization of the companies within the database. Moreover, a user pointed out that the link took too much space on the page, which already contained much information, and suggested for an information icon to be used instead.

Figure 8-6: The link to the “Definitions” sheet, explaining the company categorization system used in Biotechgate, was used by none of the evaluators.

8.4.5.6 “Licensing opportunities” search mask

No additional issues were uncovered in this search mask. However, the significance of the problem uncovered during the first pre-test (see Chapter 7.5.2), that is, the “loss” of the main sector(s) checked when selecting the product type *Biotechnology – Therapeutics* afterwards (instead of before), due to the reload of the list box options triggered by the selection of this particular product type, was confirmed.

8.4.5.7 Results list

All users were overall satisfied with the results display page. All features and links at the top of the page, that is, above the listing of the different entries, were easily found by all users, who mentioned they were happy with the new features added, such as the “Download results as PDF” function and the “Create an e-mail alert” link.

On the other hand, several users were confused by the tab-like form of the links to the different information sections of a profile in each list entry of the results list (see figure 8-7), because tabs are generally located at the top of a page or of an element, while here they referred to the entry situated above them. However, all users were quickly able to determine that the tabs represented the different information sections available in the company profile at hand.

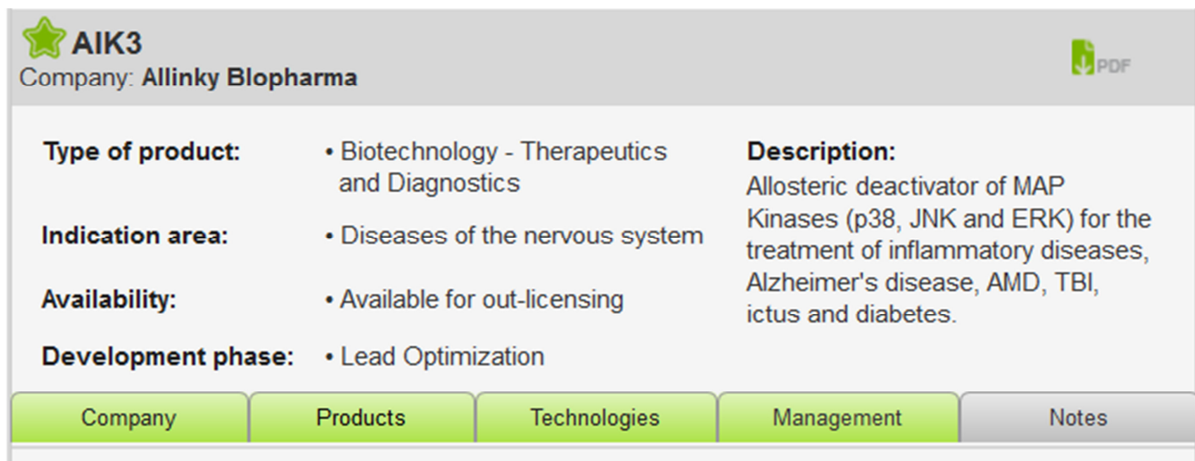


Figure 8-7: Entry of the results display page from the prototype used in the final usability tests. The tabs linking each entry of the results list to a specific information section of the company profile confused the evaluators by being at the bottom instead of at the top of the entry.

8.4.5.8 Profile view

Users were overall satisfied with the layout of the profile view. The “Update profile / report a mistake” link was found easily by all users. However, the “company” and “item” bookmark symbols in the “Products” and “Management” sections (as shown in figure 8-8) were noticed only by a minority of users, or only after the intervention of the moderator. Many evaluators mentioned that the contrast between the star symbol and its background was too weak. As a consequence, some users closed the profile view and used the bookmark symbol in the entry header on the results display page in order to bookmark the company or the product they were asked to save.

AFFIRIS AG PDF Close

Biotechgate provided by Venture Valuation Last update on 09 Jun 2014 | Update profile / report a mistake Downloaded by Diane Golay

Company Products (13) Financing (2) Management (2) Notes (0)

BIOTECH PRODUCTS OF AFFIRIS AG Products 9

AD02 Product 1/9

Abeta immunotherapy

Type of product	Biotechnology - Therapeutics and Diagnostics	Mode of administration	Oral
Availability	Available for out-licensing		
Development phase	On the Market		

IP Rights
Patent in national phase in the major economies, wholly owned by AB-Biotics S.A, with positive ISR from EPO.

Figure 8-8: Extract of the information section „products“ from a company profile.
The bookmark symbols are marked in red.

The anchors in the “Products” profile worked well. However, in the “Management” profile, users needed more time to recognize the names of the persons listed as anchors. One evaluator also mentioned that the listing of all detailed persons’ profiles at the bottom of the page was confusing, and suggested for a small “expand” symbol to be placed next to persons’ names, which, when clicked on, would open the detailed profile specific to the name chosen.

8.5 Automated Tests

8.5.1 Specific goals and research questions

The main goal of the automated tests was to get metrics on the issues addressed by the evaluators during the moderated tests. As such, their primary role was not to deliver new data on the usability on the interface, but to make it possible to better estimate the severity of the problems mentioned in the synchronous tests by allowing a more representative amount of users to perform the tasks. Basically, the expected high number of evaluators brought by the automated tests should make it possible to distinguish between issues perceived on the grounds of individual taste and more “general” usability problems. The asynchronous tests consequently had to answer the following questions:

- Taking into account the results (issues as well as elements perceived as positive) of the moderated tests, what elements / results are confirmed by the automated tests, and to what degree (percentage of evaluators having encountered the same issue / mentioned the same element)?

- Are there elements that contradict the results of the moderated tests? If so, what is the cause of this discrepancy between the two kinds of tests (how can the difference be explained)?

Ultimately, the combination of the results of both moderated and automated tests had to make it possible to rank the addressed issues by severity so as to identify what elements implied clearly the non-fulfillment of a requirement and which ones necessitated further investigation to reliably establish their usability.

8.5.2 Recruiting

The process was slightly different from that for the moderated tests, for all users were recruited per mail by Venture Valuation, without any intervention from the test moderator. No maximal number of evaluators was set, but a minimum of 10 testers was required. Furthermore, the recruiting process started a few days after the test was made live, as opposed to taking place before its launch. No incentive was used for the automated tests.

At the end of the testing phase, 27 persons (10 women and 17 men) had completed the test. Among those 27 evaluators, 12 were current users of the Biotechgate database.

8.5.3 Test design

The number of tasks for the automated tests was limited to 10, based on the assumption that the users would need more time to type in their answers than to speak them out loud and that, without having a direct interlocutor, the users might abandon the test more quickly should it take longer than they expected. Furthermore, it was preferable for the asynchronous tests to be performed without the user feeling the need for a break (a pause would distort the measure of the time needed for the evaluator(s) to complete the task(s) during which the break was taken), for which a 20-minute duration seemed the most appropriate choice (Sharp et al. 2007, pp. 630-631).

The test scenario chosen for the asynchronous tests essentially was a shorter version of the test scenario variant built around the “companies” search mask used for the moderated tests. This variant was preferred over the one centered on the “licensing opportunities” search mask because, being more general, it could potentially allow more evaluators to identify with the given tasks. Nevertheless, technical constraints made it necessary to change some tasks so that their successful completion could be identified by the tool used to create the test (see next 9.5.4). This mainly prevented the users from conducting a search as in the moderated tests, for the technical limitations of the program made it impossible to check if they had proceeded as expected / required. As a consequence, “detours” had to be found to try and get the evaluators to encounter the features needed and to create a scenario that contained all logical steps in spite of the constraints mentioned above. The final task list for the

automated tests is shown in table 8-2. The automated test made it possible to test two additional features compared with the moderated tests.

	Tasks
1	Exploring the website.
2	Finding the Biotech Financing Summary
3	Finding the UK Trends Analysis 2013
4	Finding information on the search-related features
5	Accessing a saved search
6	Finding out what kind of profiles the search in question is limited to
7	Identifying the information available on one specific company
8	Finding a specific information within the management profile
9	Bookmarking a specific person (management profile)
10	Printing out all profiles of a company

Table 8-2: Overview over the 10 tasks composing the automated tests.
The global test scenario is essentially the same as the moderated test scenario variant built around the “companies” search mask.

The technical constraints made it necessary to combine some tasks with a follow-up question so as to check if the evaluators had indeed caught the required information. In addition, some opinion questions were mixed with the tasks and the task-related questions in order to bring the evaluators to address specific features “in the heat of the moment”, right after being confronted with the feature in question.

The task scenarios were pre-tested once prior to the test launch, but not with a user representing the target audience of Biotechgate.

8.5.4 Tools and set-up

The remote usability tool used to conduct the automated tests was Loop11. Loop11 is a task-based remote usability testing program that makes it possible to create usability tests including both tasks and different kinds of (survey) questions. The program records users' first page clicks and detailed navigation paths (clickstream) as well as the number of page

views and seconds needed to carry out each task. The tasks can each be given one or several so-called “success URLs”, which enables the program to provide additional statistical data such as task success and fail rate as well as common fail pages. The test report can be downloaded at any time in various formats, including PDF or CSV, and quality filters can be added so as to exclude from the reports evaluators who do not fulfill the certain quality criteria (for example users having spent less than a given amount of seconds on a task). However, all data-recording is based on page impressions, which means that page interactions not caused or leading to a page refresh (basically all Ajax or flash-based interactions) are overlooked by the software. This was a major inconvenience in the case at hand, since many interactions within the prototype were programmed with Ajax. Nevertheless, the analytical capabilities of Loop11 were ultimately considered as outweighing the data-recording limitations, and it was decided to adapt the prototype so as to make it possible for the success of the test tasks to be identified by the program⁴².

Loop11 was also preferred over other more “sophisticated” asynchronous usability testing software providing qualitative data on the users’ interactions with the website in the form of screen and audio recordings (the users being prompted to think aloud like in traditional usability tests), such as OpenHallway⁴³, because it was considered less intrusive and demanding for the target audience of the current project and could therefore be expected to attract more testers. Additionally, Loop11 was also expected to deliver data that, on the grounds of its quantitative nature, could be analyzed more quickly, which, considering the short duration of the project, was seen as an important criterion at this stage of the thesis.

To speed up the page loading time during the test, Loop11 recommends adding some JavaScript code at the top of each HTML-page of the prototype. This was done using the AxShare plug-in feature⁴⁴ after uploading the project into the cloud for the test.

Within the framework of this thesis, Loop11 could be used for free.

8.5.5 Results

8.5.5.1 General remarks and impressions

As expected, the results of the automated tests did not uncover new usability issues, except for possibly one that will be discussed in the next subchapter. However, the evaluators shared a surprising amount of suggestions for improvement, which altogether exceeded the number of suggestions that resulted from the moderated interviews.

⁴² More details on the modifications made to the prototype in preparation for the remote usability tests are available in chapter 8.5.7.

⁴³ <http://openhallway.com/>

⁴⁴ Axure and its features are described in more detail in chapter 7.3.

The general opinion of the evaluators on the prototype and its usability was positive: 14 users ranked the global usability of the interface as good, 9 as excellent and only 1 as fair (3 skipped the question), whereby the busy pages were given as main motive for dissatisfaction. On the other hand, some users criticized the high number of clicks necessary to get to specific pieces of information.

8.5.5.2 Main Navigation

The tasks relating to the main navigation caused the most problems to the users: only 26% of the evaluators found the Biotech Financing Summary, and none of them found the UK Trend Analysis 2013. The analysis of the user paths showed that none of them chose to visit the Resource Center in order to solve either task, and that most of them did not click any of the links on the homepage, despite staying on the page for more than 30 seconds on average. It is difficult to put the finger on the exact cause of failure regarding the two tasks in question. It is conceivable that they were misunderstood by the users or even that the evaluators did not seriously try to solve them, which could explain why the majority of them did not perform any clicks on the homepage.

8.5.5.3 Homepage

Some users described the homepage as being particularly busy. The low success rate of the two tasks relating to the main navigation casts doubt on its effectiveness, which seemed to have been established in the moderated tests. However, since none of the evaluators commented on that particular topic, it impossible to draw any conclusion.

8.5.5.4 Search guide

Only half of the users succeeded in accessing the search guide, but the cumulated user path analysis suggests that most of the evaluators belonging to the second half simply did not try to perform the task. Nevertheless, the fact that one user did not identify the guide despite visiting the “company database” page suggests that the link to the search guide on the page in question lacks visibility and should be located at the top of the page instead of at the bottom.

The search guide seemed to satisfy the vast majority of evaluators. However, some of them suggested listing the functionality of the key features, such as the bookmark function, at the top of the page so as to make any further click unnecessary to find this very basic information. Another suggestion was to add the contact details of the person responsible for providing technical support.

8.5.5.5 “Companies” search mask

Search within Medicion Valley only
 Search in bookmarks
 Limit results to entries including specific profiles
 (check to show profiles list)

All profiles
 Products
 available for out-licensing

Biotech	Medtech
<input checked="" type="checkbox"/> Preclinical	<input checked="" type="checkbox"/> In development
<input checked="" type="checkbox"/> Phase I	<input checked="" type="checkbox"/> On the market
<input checked="" type="checkbox"/> Phase II	
<input checked="" type="checkbox"/> Phase III	
<input checked="" type="checkbox"/> On the market	

Technologies
 Financing rounds
 Valuations
 Management details
 Licensing deals

Profiles with notes
 Type of relationship: All

Figure 8-9: Extract from the *Companies* search mask as the evaluators of the automated tests encountered it: the dialog box allowing to filter search results on the basis of the information sections available within the company profile is expanded.

The great majority of users did not object to the filter allowing to reduce the search results to entries containing specific information sections being situated in the first half of the search mask (as shown in figure 8-9). This contradicts the feedback received during the moderated tests, but the difference of opinion could be explained by the fact that, in the automated tests, the users were not required to perform a search and hence did not need to locate the filter menu themselves. The discrepancy also suggests that the mask is easier to understand when opened on page load (that is, if the user is not required to open it himself, as it was the case in the moderated tests).

8.5.5.6 Results display page

Several users indicated that the location of the tabs containing the links to the different information sections of a company profile at the bottom of the search entries had confused them. Furthermore, the evaluators mentioned the need for more company details to be displayed in each entry of the results page, such as financial information and product names.

Some evaluators were confused by not finding a print button to print out the full company profile directly from the results display page. However, the majority of users seemed to be fine with having to download the profile as PDF before being able to print it. In addition, most evaluators used the “Download as PDF” button located on the results display page to solve

the task, which suggests that it is clear that the feature refers to the whole profile and not only the short company profile overview visible on the page.

8.5.5.7 “Management” profiles

The majority of the evaluators declared that they were satisfied with the layout and contents of the management profile and that they found the additional information provided useful. On the other hand, several users pointed out that the anchors towards the detailed information are not clearly visible and hence rather unintuitive to use.

Although a small number of users succeeded in bookmarking a specific person, the majority of the evaluators overlooked the person-specific bookmark symbol. The low success rate for this task is consistent with the results of the moderated tests.

8.6 Diagnosis

The combined results of both moderated and automated usability tests show that the evaluators were globally satisfied with the contents, the appearance and the usability of the fourth functional prototype. The vast majority of users assessed the overall usability of the interface as “good”, while a smaller, but nevertheless significant number of users described it as “excellent”. Very few evaluators issued negative comments on the design or the contents of the prototype.

However, several issues and “weaknesses” of the concept could be uncovered, making it possible to determine what requirements are not yet fulfilled by the current redesign concept and thus what components need to be modified and issues fixed in view of an implementation of the concept. The requirements concerned were identified on the basis of the most recurrent issues encountered or mentioned by the evaluators of both moderated and automated tests. Table 8-3 gives a quick overview over the requirements proven partially or not fulfilled by the usability tests.

In addition to the issues listed in table 8-3, a recurring remark of the evaluators of both moderated and automated tests was the large, at times even slightly overwhelming quantity of information displayed on single pages, in particular the homepage and the *Companies* search mask. Furthermore, several users expressed concern regarding the capacity of the design to adapt to smaller screen devices, in particular mobile devices such as tablets and smartphones.

Requirement ID	Fulfillment grade	Issue
2.1.2.1	Partially fulfilled	Too many clicks are necessary to access information on the functionality of the basic database features
2.1.2.3	Partially fulfilled	The context-sensitive help is at places not in the needed form and is hence not used by the users ("companies" search mask). At other places, it is missing ("management" profile).
2.2.2	Partially fulfilled	The name "Biotech Financing Summary" is unclear. Users expect to find in the resource center instead of under "Industry News".
2.3.3	Not fulfilled	Users do not use the context-sensitive help provided to find a specific sub-sector
2.4.9	Partially fulfilled	The tab-like form of the links to the different information sections available of a company profile is confusing.
2.5.6	Not fulfilled	Users have difficulty locating the bookmark feature.
2.5.6.1	Not fulfilled	The company-specific bookmark symbol in the profile view is overlooked by users.
2.5.6.3	Not fulfilled	The item-specific bookmark symbol in the profile view is overlooked by most users.

Table 8-3: Overview over the requirements partially or not fulfilled by the redesign concept, on the basis of the combined results of the moderated and automated usability tests conducted.

9 Recommendations for improvement

Note to this chapter: the purpose of this chapter is to present some insights and possible solutions as to what concrete elements of the concept require further improvement and how this could be achieved in accordance with the results of the usability tests and / or observations of the author during those tests. The partial prototypes presented below are not part of a functional interactive prototype and should not be considered as a substitution of the corresponding components of the fourth functional prototype (V4).

9.1 Information Architecture and main navigation

In order to ensure the consistency between the public website and the subscriber section, certain category names in the main navigation could be modified: the *Biotech Financing Summary* could be renamed into *Biotech Financing Report* (a change that would be especially meaningful / appropriate since some evaluators mentioned not understanding what exactly the former label referred to). In addition, as a way to make the drop-down menu of the *Industry News* category more easily / clearly readable, *Industry News* could be renamed into *Company News* and *Life Science Conferences* simply into *Conferences*.

The full final sitemap of the final prototype is shown in figure 9-1.

ID	Pate Title / Content Area	Type	Summary & Comments
0	Homepage	Start Screen	Overview over the Biotechgate features (in accordance with the different categories / menus of the main navigation)
1	Search		
	Company database	Info page	
	Licensing deals database	Info page	
	Investors database	Info page	
2	Global Life Science Map	Map Search	See http://www.biotechgate.com/gate/v3/companies.php?info=global_map
3	Industry News		
3.1	Company News		http://www.biotechgate.com/gate/v3/news.php
3.2	Biotechgate Financing Report	Download page	Biotech Financing Summary, see http://www.biotechgate.com/gate/v3/statistics.php?info=vcdeal
3.3	Conferences		http://www.biotechgate.com/gate/v3/events.php
3.4	Life Science Jobs		http://www.biotechgate.com/gate/v3/jobs_overview.php
4	Resource Center		
	Biotechgate Tutorials	RS Category	http://resourcecenter.biotechgate.com/category/features/#sthash.KY8sMxvL
	Life Sciences Reports	RS Category	http://resourcecenter.biotechgate.com/category/reports/#sthash.gn5m5Ujv.dpbs
	Biotechgate Press Releases	RS Category	http://resourcecenter.biotechgate.com/category/press-releases/#sthash.tGFdIRqN.dpbs
	Biotechgate Publications & News	RS Category	http://resourcecenter.biotechgate.com/category/publications/#sthash.7cKold2i.dpbs
5	Biotechgate Statistics		
	Companies by Sector		http://www.biotechgate.com/gate/v3/statistics.php?info=statistics
	Companies by Country		http://www.biotechgate.com/gate/v3/statistics.php?info=countries
6	Contact & Support		
	Add / Update Company		http://biotechgate.com/gate/v3/add_company.php
	Add Event		http://biotechgate.com/gate/v3/event_info.php
	Search guide		Overview over the search-related features in the database
	Definitions		http://biotechgate.com/gate/v3/faq.php
	FAQ		http://biotechgate.com/gate/v3/faq.php
	Contact & Impressum		http://www.biotechgate.com/gate/v3/contact.php

Figure 9-1: Suggested sitemap of the new subscriber section (final version)

In addition, the possibility of adding the *Biotech Financing Report* to the *Resource Center* (either in the already existing category *Life Sciences Reports* or in a new, independent *Biotech Financing Report* category) should be considered, for this is where a majority of users expected to find it.

9.2 Homepage and basic layout

BIOTECH GATE
GLOBAL DATABASE
Subscriber Section

Home My Account Log off

Search Global Life Science Map Industry News Resource center Biotechgate statistics Contact & Support

Hans-Theodor Weber
(Last visit: 8 Jun 2014)

Quick company search

Home

Company database ▶

- (31'024) Companies
- (37'780) Products
- (3'835) Technologies
- (5'491) Financing rounds
- (463) Company valuations
- (103'907) Management details
- (6'038) Licensing opportunities

Deals database ▶

- (1'631) Deals

Investor database ▶

- Investors

Search Guide

Check your **account settings** on [My Account](#) or **add, update or recommend a company** on the [Add a company page](#)

Biotechgate Features Overview

Database Search

Search the Biotechgate company database and identify partners, find licensing opportunities, benchmark deals and much more!

Global Life Science Map

Locate on the map thousands of life science companies and get statistical information about company clusters all around the world.

Latest Industry News

Check out the latest [company news](#), [life sciences events and job opportunities](#). Or download the latest [Biotech Financing Report](#).

Reports & Downloads

Download statistical [Life Sciences Reports](#) and get the latest [Biotechgate news, press releases and feature updates](#).

Database Statistics

Get statistics on the [covered countries](#) and [covered sectors](#) within Biotechgate.

Contact & Support

Get started with our [search guide](#) or get a look at our tutorials. Find the answer to your questions in our [FAQ](#).

Already familiar with Biotechgate?
Choose another welcome page: Search Companies

Get started in Biotechgate

Biotechgate General Demo

Go on a short tour within the Biotechgate subscriber section and get an overview over its core features and services.

Want to learn more? See all demos & tutorials!

[Back to top](#)

Saved Searches

You have **1 saved searches**. Click on a link to load a saved search.
[Learn more about this feature](#)

Cosmetics Companies (EU)

Bookmarks & Notes

- Bookmarks**
 - Companies (1)
 - Products
 - Management[Learn more about this feature](#)
- Notes**
 - All notes
 - Profiles with notes[Learn more about this feature](#)

Partner Section

- Statistics download**
 - Company stats
 - Company stats archive
 - Pipeline & financing rounds
 - Indication matrix
- Profile download**
- News**
 - Add news
 - Edit my news
 - See all news
- Information**
 - API Documentation
 - Users' guides[Learn more about this feature](#)

Latest updates

13 June 2014

- Targeted Cell Therapies, LLC
- Sound Pharmaceuticals, LLC
- CrispTelc, LLC
- J.A.R. Pharmaceuticals, Ltd.
- MicroLeman

Updates within the latest 30 days:

- 1'792 Company profiles
- 873 Products
- 68 Technologies
- 160 Financing rounds
- 3'219 Management details

Latest publications

- Biotech Financing Report (Juli 2014)
- UK Life Sciences Trend Analysis 2013

Search	Global Life Science Map	Industry News	Resource Center	Biotechgate Statistics	Contact & Support	My Account
Companies		Company News	Features & Support	Companies per sector	Add / Update company	My Profile
Licensing deals		Biotech Financing Report	Life Sciences Report	Companies per country	Add event	Subscriptions
Investors		Conferences	Press releases		Definitions	Update Credit Card
		Life Science Jobs	Publications & News		FAQ	Upgrade
					Contact & Impressum	

2014 Venture Valuation [To the top](#) [Terms of use & Privacy Policy](#)

Figure 9-2: Possible new arrangement of the homepage

A helpful addition to the basic layout could be a *Latest publications* bullet list in the *Latest updates* box in the right sidebar (made on the basis of one evaluator's suggestion), which

would contain links to the latest reports published in Biotechgate (see figure 9-2). This would allow the users to access the newest reports more easily and it would increase the possibility for users unaware of the availability of those reports to see them “by chance”.

Modifications should also be made to the homepage in an attempt to make it look less “overloaded” with information: a possible way to “lighten” the homepage is suggested in figure 9-2. Another possible solution could be the one used by the Swiss Life Sciences Database⁴⁵ on its homepage: a box containing, in its normal state, solely a title and a meaningful icon, in which text first appears when the user hovers on the box in question. This effect is demonstrated in figures 9-3 and 9-4.

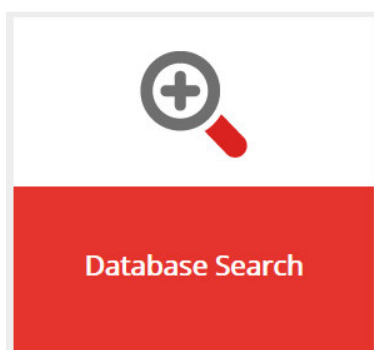


Figure 9-3: Normal box state (Swiss Life Sciences database)

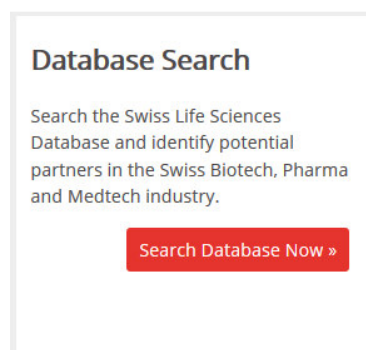


Figure 9-4: Hoverbox-state (Swiss Life Sciences database)

Furthermore, it would be important to adapt the contents of the *Database Search* box to the company database, and to change the link at the bottom of the box in question so it leads to the *Companies* search mask.

The Biotechgate General Demo video at the bottom of the page is expected to contain a short overview of the contents, features and services available in the subscriber section. It should also be mentioned where on the website users can find help and support.

9.3 Search guide

Several recommendations for further improvement can be made concerning the search guide:

- Instead of having text boxes explaining the role and functionality of a feature, short video-tutorials could be made available (several users asked for such tutorials);
- Another, or rather a complementary solution could be the use of interactive boxes (as demonstrated above in figures 9-3 und 9-4 on the example of the Swiss Life Sciences database), in which case the symbol used for the “normal” state of the box could be

⁴⁵ <http://www.swisslifesciences.com/swiss/portal/index.php>

the one of the feature – e.g. for the bookmark feature, the corresponding star symbol. This would allow the users to immediately visualize what feature is attached to what symbol;

- As suggested by one evaluator, a short PDF-document comprising a short description of the main search-related features could be made available for download. The feature descriptions on the current start page of the subscriber section (shown in figure 4-2) would probably be suitable.

9.4 Search masks

The *Licensing opportunities* search mask does not seem to require any significant modifications, as the users seemed globally satisfied with it. However, it could be useful to program an error message to address the problem of the “loss” of the main sector selection when selecting the product type “Biotechnology – Therapeutics” when the main sector selection is already made, in order to make this system issue visible and understandable to the user. On the other hand, the *Companies* search mask in its current form does not fulfill the requirements, both where the layout of the filters and the context-sensitive help are concerned. Consequently, two fundamental recommendations need to be made, both of which are illustrated in figure 9-5.

- **Context-sensitive help:** by means of small information icons, indications on the checkboxes “Search within Medicon Valley” and “Search in bookmarks” as well as on the different main sectors could be provided. In the latter case, the information provided would not have to be more than the corresponding list of subsectors; this would simply make it possible to the user to search for a specific sub-sector more quickly, without needing to check and uncheck each main sector one after the other in order to localize the sought subsector;
- **Filters – Profiles including:** in the previous prototype, it had been attempted to move that feature to the top; however, usability tests showed that this did not work, for the users expected to find the feature at the bottom of the search mask, generally under advanced filters. As such, it would probably be best to re-create the tab “Filters –Profiles including” (corresponding to the current design of the search mask) for this specific filter option, because it cannot be logically integrated into the *Advanced filters* section. However, unlike the existing design, such a solution would presuppose the merging of the three filters “profiles including”, “profiles with notes” and “products”, as shown in the previous chapter in figure 8.5.5.5.

search

[Text search help >>](#)

Search within Medicon Valley only ⓘ

Search in bookmarks ⓘ

Company name

Continent / Region

Country / State

Country	State
All countries	-- No country selected --
<input type="checkbox"/> Algeria (4)	
<input type="checkbox"/> Argentina (17)	
<input type="checkbox"/> Australia (291)	
<input type="checkbox"/> Austria (366)	

Main sector / Subsector

Main sector	Subsector
-- Click to expand --	-- No main sector selected --
<input type="checkbox"/> Biotechnology - Therapeutics & Diagnostics ⓘ	
<input type="checkbox"/> Biotechnology - R&D Services ⓘ	
<input type="checkbox"/> Biotechnology - Other ⓘ	

Advanced filters -- Click to expand --

Financing-related filters -- Click to expand --

Filters - Profiles including -- Click to expand --

reset search

Figure 9-5: Possible new arrangement of the *Companies* search mask

9.5 Results display page



Figure 9-6: Entry on the results display page with rectangular link buttons instead of tabs

The most important modifications needing to be conducted on the results display page concern the results listing section. The tabs at the bottom of each entry require a different shape, for example a rectangular form (as shown in figure 9-6), and the bookmark symbol, which had provisionally been placed on the left, could / should be placed again at the top right corner of each entry (see figure 9-6). This suggestion is made following the observation that all users found the *Download as PDF* symbol, situated in the same spot.

A further recommendation for the results display page would be to reconsider what information should be displayed in each entry. Although a majority of users were satisfied with the information display, some evaluators criticized the lack of financial information and some additional indications on the products (as for example the names of the products mentioned, which would make it easier to then find those products within the *Products* information section of the company profile). However, because of the range of user profiles represented among the target audience of Biotechgate, conducting a survey among the users and asking them to check the elements they would find practical to see on the results display page could be solution to assess the exact needs of the users more precisely.

A further, though less significant improvement, would be to adapt the text of the *Download as PDF* dialog window from “Download all profiles” and “Select all profiles” to “Download all information sections” and “All information sections” (as shown in figure 9-7), so as to ensure the use of a consistent language / vocabulary throughout the website.

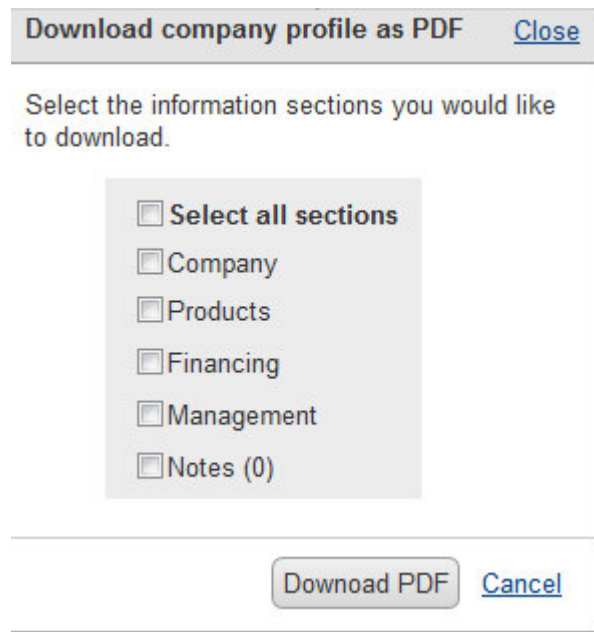


Figure 9-7: Possible wording of the Download profile as PDF options

9.6 Profile view

A recommendation concerning the basic layout of the profile view would, as in the results display page, be to re-locate the company-specific bookmark symbol to the top right corner, so that the user can see it when attempting to download the profile / information section.

Similarly, for the management information section, a suggestion for improvement would be to place the detailed profile of a person (containing the additional information planned to be integrated into the section in question) right below the name. The appearance of the profile would be triggered by the user clicking on the name of the person concerned. To indicate the existence of such a “hidden” profile, a small black arrow next to each person’s name could be added. With such an arrangement, it could be possible to re-locate the person-specific bookmark symbol to where it currently is in the existing design.

The same modification could be performed in the *Products* information section. The green color of the bookmark should make it more visible on the dark background of the product header as well.

A further, more general suggestion concerning the bookmark symbol would be to choose an “active” color (that is, the color of the bookmark symbol when a bookmark is set) that is in strong contrast with the initial green used so far, for example yellow.

It is questionable whether the print function should be removed altogether from the database. Design-wise, its deletion “lightens” the header of both the profile view and the results entries on the results display page and the usability tests suggested that only a minority of users were disturbed / confused by its disappearance; however, a larger sample of users should be consulted before making a definitive decision.

10 Discussion

The new design concept for the subscriber section of Biotechgate in the form of an interactive prototype (V4) developed within the framework of this thesis in compliance with the UCD principles and methodology has been globally met with acceptance and positive feedback by the vast majority of the evaluators during the final usability tests. As such, the information architecture, content strategy and global appearance and layout of the new design can be considered as fulfilling the general usability-related requirements set for the redesign project and, by extension, corresponding to the needs and expectations of the Biotechgate users.

Nevertheless, the final usability tests uncovered several more “local”, that is, component-specific, issues in the prototype, and showed that the newly elaborated concept did not (entirely) fulfill all the requirements set for the redesign. Consequently, and since no further iteration of the prototyping and usability testing processes could be conducted within the scope of this thesis, a set of recommendations and suggestions for improvement based on the results of the final usability tests and the observations of the author during this development phase were presented and partially illustrated.

As such, while the final prototype presented here does not fully satisfy the requirements set for the redesign project and while certain elements of the concept need to be further improved for it to be fully implementable, the conceptual design, concrete design solutions and additional recommendations for improvement provided as well as the requirements set itself elaborated within the framework of this thesis constitute a solid basis for further improvement and the implementation of a new subscriber section that will create a better user experience for the users of Biotechgate.

As for the methodology, the methods, techniques and guidelines were applied systematically and, for the most part, in an appropriate manner, to the particular case at hand, that is, the redesign of the Biotechgate portal. However, two significant issues, both of which are related to the automated remote usability tests, must be mentioned. First, not enough users were recruited for the final moderated usability tests, which led to the impossibility of pre-testing the automated test variant with real Biotechgate end-users. As a result, the suitability of the tasks that had been specifically developed for the automated tests could not be verified, and it could not be observed if the visibility of the remote testing tool prompted another user behavior than the one observed during the moderated tests – two questions whose answer could have led to a better understanding and interpretation of the results of the automated tests. The second issue concerns the remote testing tool itself. More specifically, the technical limitations of the program, and above all, their implications for the analysis of the results in consideration of the nature of the tasks and the prototype, were underestimated

during the tool selection process. As such, it turned out to be impossible to even formulate a hypothesis as to the reason(s) behind the users' failing a task, which could for example have been possible with a testing tool supporting mouse tracking.

Those two methodology-related issues led to the results of the automated tests being partially unexplainable and casting some doubt on the usability of some central components of the concept, in particular the homepage and the main navigation, whereas they could have resulted in much more valuable and reliable input had the needs of the project been better prioritized and had the implications of the tool's technical limitations been more realistically estimated.

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Die Informationswissenschaft ist in der Schweiz noch ein relativ junger Lehr- und Forschungsbereich. International weist diese Disziplin aber vor allem im anglo-amerikanischen Bereich eine jahrzehntelange Tradition auf. Die klassischen Bezeichnungen dort sind Information Science, Library Science oder Information Studies. Die Grundfragestellung der Informationswissenschaft liegt in der Betrachtung der Rolle und des Umgangs mit Information in allen ihren Ausprägungen und Medien sowohl in Wirtschaft und Gesellschaft. Die Informationswissenschaft wird in Chur integriert betrachtet.

Diese Sicht umfasst nicht nur die Teildisziplinen Bibliothekswissenschaft, Archivwissenschaft und Dokumentationswissenschaft. Auch neue Entwicklungen im Bereich Medienwirtschaft, Informations- und Wissensmanagement und Big Data werden gezielt aufgegriffen und im Lehr- und Forschungsprogramm berücksichtigt.

Der Studiengang Informationswissenschaft wird seit 1998 als Vollzeitstudiengang in Chur angeboten und seit 2002 als Teilzeit-Studiengang in Zürich. Seit 2010 rundet der Master of Science in Business Administration das Lehrangebot ab.

Der Arbeitsbereich Informationswissenschaft vereint Cluster von Forschungs-, Entwicklungs- und Dienstleistungspotenzialen in unterschiedlichen Kompetenzzentren:

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