Entrepreneurs and Accountants **Vision 2025**

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> **The broader one's understanding of the human experience, the better design we will have.**
>
> Steve Jobs

FIRST THINGS FIRST

Note of Thanks

I am grateful for mentors, family, and **friends.**

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Project in brief

Executive Summary

This project in a **nutshell.**

Introduction

The world is changing exponentially and new technologies enable startups to dislodge incumbents. Meanwhile in the competitive accounting market, the superior technology solutions tend to win. The entrepreneurs of today are techno-savvy and rapidly adaptive to the demands of a changing world.

Today's entrepreneur faces a world of tremendous opportunities and challenges. Reach to a globally connected audience has given everyone a platform to offer valuable products and services, but at the same time, the time demands on the entrepreneur have increased, and it is becoming harder and harder to keep up with the flood of information.

At the same time, the accountants are evolving while preserving the core of their profession. New technologies necessitate new laws and regulations, and accountants keep themselves updated. They also face the pressure of increasing demands by the entrepreneurs. Since most entrepreneurs work round the clock, they expect the same from accountants.

The software tools used by them play a crucial role in managing their relationship. Software offerings help them in finishing work faster, making sure the work is accurate and everything is properly communicated. Since the invention of computers, there has been a push to use them to reduce manual and repetitive tasks, so that people can focus more on advice and coaching. However, with all their sophistication, the tools of today are still not enough for the demands of tomorrow.

Problem

Today's tools are lack the capacities to function in tomorrow's world. The strategic design challenge presents itself as utilizing the power of technology in the best way to support the entrepreneur-accountant relationship in an increasingly complex world. As a result, the research was started with the aim of exploring needs of entrepreneurs and accountants as well as new technologies in order to:

- Uncover the opportunities offered by latest developments in technology.
- Help entrepreneurs and accountants to collaborate better with a better user experience.

This report is the result of a M.Sc. graduation project in affiliation with the Industrial Design program at Delft University of Technology and in collaboration with Exact, a global provider of business software located in Delft.

Research & Key Insights

Research was carried out using literature, existing company documents, and semi-structured interviews with entrepreneurs, accountants, and experts in the field of technology, business and policy. The data gathered was translated into insights describing:

- Core needs and motivations of entrepreneurs
- Dimensions of the entrepreneur-accountant relationship
- Competitive Advantage of Accountants
- Key trends in technology which are clearly meaningful for the users
- Principles of human behavior which would remain untouched with passage of time

The research led to the following conclusions.

Insights about Technology

Machine Learning (ML) has made a wide ranging variety of predictions possible and with increasing data, ML algorithms will only get better. This will help entrepreneurs in taking hard decisions with the best data on hand. Companies which can use this technology will have better chances to win in the marketplace. Most big technology providers (including Exact) are already investing considerable resources in Machine Learning Technologies. At the same time, the high-end, state-of-the-art ML algorithms require considerably expensive hardware resources, which can constrain organizations in the short term. ML is a set of general purpose techniques which can be applied to other technologies like Natural Language Processing (NLP) as well as Blockchains.

In the realm of Human Computer Interaction (HCI), Voice User Interfaces (VUIs) are becoming increasingly popular. However, they are suitable for simple and narrow ranges of tasks. Complete human language understanding is far away, even if it is possible. However, language conversion from talking to text is now highly accurate and opens up opportunities for new and interesting products.

The blockchain is a technology which might have far ranging effects but it is not well understood. However, it promises to offer interesting solutions to entrepreneurs, and even individuals to better monetize their time and attention. While many startups are already creating promising products, it will take more time for them to become mainstream.

Overall, the control of data comes out as a key competitive advantage for any technology driven company. Data about customers can be fed into ML algorithms to generate insights and more data means better algorithms, and hence better end user experience. However, there is a lot of data which is not yet captured from human interactions. And a lot of data which is captured is not accessible with ease. Apart from the information stored in human conversations, the

emotions and personality of people are also useful sources of information. However, most of these sources of information are not completely tapped yet. Most spoken conversations are not captured. And the ones which are captured, like a call on WhatsApp, are not accessible to the users for searching or asking questions. It is believed that the capture and access to these sources of information would open up tremendous possibilities for creating value.

Insights about Entrepreneurs and Entrepreneurship

Overall there has been a growing trend towards entrepreneurship and startups at a global level. More and more people are starting companies and many companies are smaller - aided by services which can be bought off-the-shelf.

Entrepreneurs are driven by the desire to make an impact which outweighs their need for financial comfort. They are always thinking about opportunities and want to see how they are performing in real-time. They are very passionate about their teams and pay a lot of attention to their people. While the growth needs of different entrepreneurs differ, all of them face serious demands on their time.

To deal with the uncertainties of their work, entrepreneurs deploy multiple strategies for attack and defense. The attacking strategy can be seen in terms of being always on the lookout for new opportunities by the entrepreneurs. Also, most entrepreneurs are aggressively data driven and use the latest tools combining the power of man and machine to get tasks done.

The defensive strategies of entrepreneurs revolve more around relationships and matters of identity and trust. Founders start companies with people they already know, and generally in fields they are already familiar with. They also seek out and trust recommendations when choosing accountants. In this arena, they trust their gut decisions and look for a 'click' with the people they want to work with.

Entrepreneurs view accounting as a sort of magic box. The accounting language is not 'human readable' and they prefer to leave it to the experts. They tend to trust their accountants blindly. While they know the accountants add value to them, they do not really know how much value, and generally adopt an attitude of cautious avoidance. Most of them approach their accountants only in case of unforeseen events, like a regulatory change. However, most entrepreneurs have a story to tell where their accountant added significant value to them in a way they had not anticipated.

Insights about Accountants

Accountants face the challenge of different demands from different kinds of entrepreneurs and do their best to service them. They are always on the lookout for ways to create value for their clients.

Accountants prefer to have face to face contact with the entrepreneurs and look at their business from a regional perspective. That is, they like to service entrepreneurs from a specific region near to them, so they can maximize personal meetings and face to face contact. They think digital tools actually impair good communication.

They also willingly spend time coaching the entrepreneurs and creating value by connecting entrepreneurs to each other.

Insights from Cognitive Science

Latest development in cognitive psychology reveal the systematic ways in which human beings make errors of judgement and decisions under uncertainty. The human mind evolved as a storytelling machine and has the tendency to make errors when confronted by sparse information. It tends to fill in the gaps by itself and see patterns which do not exist. At the same time, the mind uses heuristics and biases to filter large amounts of information - thus creating a tendency to leave out important pieces.

Solution

The insights were tied into a single coherent context of the future world of 2025. A vision statement and product and interaction qualities were articulated - which would set the direction for concept development. To further refine the solution, key problem statements were articulated for both entrepreneurs and accountants, and scenarios were developed to showcase how the solution would work.

The final concept is called Exact 'Centaur' - the name denotes the power of man and machine. It enables entrepreneurs to perform better by providing them an overall financial score and actionable insights on how to improve it. Entrepreneurs can do simple tasks using the voice assistant 'Lipi' and finally, for strategic advice, entrepreneurs can call their accountant from Centaur. The calling interface is enhanced by having the capability to see the entrepreneur data in one place, on the same screen. Finally, all conversations are transcribed and summarized in the system, and can be accessed by the entrepreneur for future reference.

At the accountant side, he or she can see the client's scores to understand their performance, as well as see the emotions of both sides in real time. This enables them to give more compassionate advice. Accountants also have an overall client performance score to improve their own performance.

To extend the concept to market, branding and communication was developed for the product including brand name, logo,

press release and Frequently Asked Questions (FAQ). These help in communicating the benefits in a simple language.

Reception

The concept was viewed favorably by multiple stakeholders including entrepreneurs, accountants as well as design and business experts. A simple user interface and navigation stood out as the key strengths, which was seen as a requirement especially in case of complex accounting products. The viewing of emotions during video calling was also well received. Since the concept is designed for a future which is very far ahead, there needs to be more research for design as well as technology development to bring it to life. This concept provides a solid base to direct further research and development efforts.

Conclusion

This project was successful in achieving its key purposes as outlined in the problem statement. Research on technology trends led to many insights which can help in further concept development, and the concept outlines a likable and innovative user experience for entrepreneurs and accountants to collaborate.

This research is also useful to Exact in preparing them for the future of accounting, as well as giving them insights on entrepreneur-accountant relationship. At the same time, this research outlines a lot of possibilities in technologies which can help Exact in developing new products. Exact will win in the market if it can combine technology with a differentiated user experience, and it is hoped that the insights help Exact in taking concrete steps in this direction.

Table of Contents

Chapter 1

Project Introduction

This project is about entrepreneurship, accounting, technology, and **design.**

This report details the Graduation Project at the Delft University of Technology (TU Delft) Netherlands, as part of the Strategic Product Design (SPD) program at the department of Industrial Design and Engineering (IDE).

The SPD program is a Master's course which aims at the business context of products and service design. It's focus is at the fuzzy front-end of innovation as shown in **Figure 1**. This program aims at providing students knowledge, tools and techniques with which to analyze the market and competitive opportunities present for a company, and to translate those opportunities into a product or a service. The products or services should have a solid economic and social rationale.

This project began full-time in July 2017 and was completed in November 2017. It was started by Exact Software, a company which makes business software for entrepreneurs and accountants, with its headquarters in Delft. Exact Software is heavily investing in the technology of tomorrow, and hence sent out positions for students to work on exploring the applications of these technologies. For this particular project, Exact was looking for a conversational user experience design, but with further discussion and learning, the project evolved into a more holistic vision for a product of the future, with a focus on technology.

This report outlines how this project was carried out, from opportunity identification to concept development. The report will first cover the context in sufficient detail to make the reader understand the business and the technology context. It will outline the key technologies of today and how can these be used, and will also outline the business and competitive landscape of Exact software.

After a solid grounding, this report will explain the design challenge and the method used to approach it. Finally, the product idea will be proposed and explained in light of the research conducted.

1.1 The Big Picture

It is almost redundant to say that we live in an era of exponential growth (Kurzweil, 1999). Technology advances almost everyday because the very infrastructure of innovation has changed (Dror, 2017). With more than 2 billion people (Statista, 2017) using smartphones and almost 50% of the world connected to the internet (CIA World Factbook, 2017), every entrepreneur building digital products has instant access to a potentially global audience.

This infrastructure has unleashed a barrage of innovation, with new products and startups flooding the market at a rapid pace. The last decade has seen rapid advances in technology - from algorithms which can make machines learn to distributed, cryptography enabled ledgers. Breakthroughs in big data, processing power, distributed computing, and connectivity have prepared a fertile field for new products and companies to flourish.

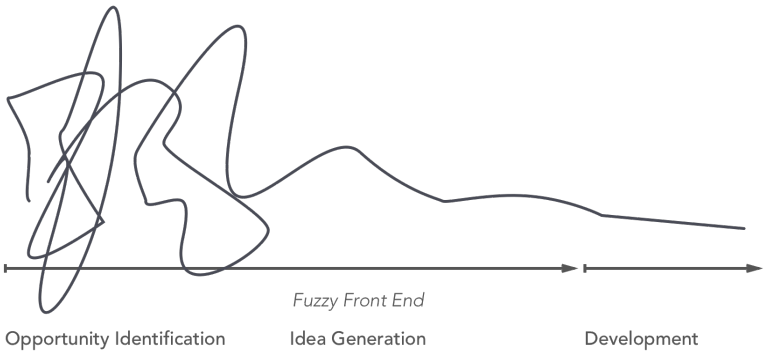

Figure 1. Fuzzy Front-end of Innovation

There are a few key reasons why a technology oriented project was chosen:

- **Dominance of technology in today's world**: The development of technology, from the invention of writing to invention of spacecraft, has been a signal of human growth and innovation.
- **Focus of Exact on Technology:** Exact makes software for business management, a high-technology product, and hence, needs to invest in the latest technology developments.
- **Personal interest and background:** Having my bachelor's degree in Computer Science and Engineering and professional experience in technology driven firms, I found it a good fit where I could contribute through my understanding of software products and business models.

However, big companies sometimes find it hard to integrate the new technologies into their current products. By definition, the bulk of their profits lie in their current customer base, hence they cannot rush to do anything which might jeopardize their key sources of revenue. At the same time, they cannot ignore the technological push - because they need to handle technology startups which are agile, technology savvy, venture capital funded (sometimes) and most importantly, have little

to lose.

Hence established business players need to take a measured approach towards creating products using new technologies. They have their brand value, customer knowledge, and financial resources on their side. They now have to leverage their understanding of customer needs to create technically advanced products which truly solve the user's problems - in better ways than imagined.

This project was undertaken at Exact Software with this mindset. Exact has evolved its offerings as underlying technology has evolved, and is aggressively looking for ways to adapt the latest technology trends for its current products. This graduation project is the result of this approach. First, I try to understand technology trends and applications, as well as core customer needs. Then, based on insights from the research, I conceptualise a product which would meet the customer needs in the best possible way.

1.2 The Assignment

Exact Software has a vision of the future where most routine accounting tasks are done automatically, leaving entrepreneurs to focus on their core business, and accountants to focus on financial advice and coaching. The advances in machine learning and natural language processing have the potential to take this vision closer to reality.

However, Exact does not leverage these new technologies in its existing product suite. This makes them vulnerable to competitors who might launch such products - this hurts their brand image in the short term and leaves customer value on the table in the longer term. Hence, this project aims to leverage the opportunities offered by technology advances to create and capture this customer value.

This project is aimed at articulating products which are deeply rooted in customer needs and powered by the latest technology. In case of Exact, both the entrepreneurs and accountants are customers, and both have different needs. However, it is their relationship where Exact steps in. Hence, the project is defined as an attempt to create a product which enhances the relationship between entrepreneurs and accountants by leveraging the opportunities provided by latest developments in technology.

The results of this project will be helpful to Exact in these ways:

Insights into Applications and Limits of Technology

This project will explore latest relevant technology trends with their possible applications - these applications will serve as source of ideas for the managers when they are brainstorming to enhance the product. The insights drawn from customer interviews will also serve as additional drivers for ideation.

New features 'on the shelf'

The concept will outline features for a future context which might be implemented at Exact. Based on their feasibility and engineering challenges, the managers at Exact may refer to these to implement at the right time.

1.3 Goals and Relevance

The challenge of this project lies in fulfilling the core needs of entrepreneurs and accountants with the rapid transitions in technology. Accounting has evolved with every big advance in technology, and thus it needs to be articulated how it can evolve again with the new technologies progressing in the world. I propose to define how Exact can support entrepreneurs and improve their experience of accounting and collaborating with accountants.

The main research goals of this project are:

- To develop an understanding of the key motivations for entrepreneurs, their challenges and vision
- To develop an understanding of how accountants provide value to entrepreneurs and what challenges do they see for accounting in the future
- To develop an understanding of how accountants and entrepreneurs interact and collaborate (that is, the dimensions of their relationship)
- To develop an understanding of new technologies and explore their applications and trends - with an aim of using their potential in enhancing the entrepreneur accountant relationship
- Finally, to create a coherent picture of the future and define what kind of product would be the ideal fit for such a future

The project aims to articulate a product for the future - something which would take place in the next 8 to 10 years. This time horizon has its pros and cons. On the one hand, some bold guesses can be made about future applications - even if they are not available at the moment. On the other hand, it necessitates the research on a very broad level. This also pushes the research into exploring principles which do not change in time or change very slowly, hence giving a solid foundation for concept development.

1.4 The Approach - Vision in Design

Since the project focus is broad and futuristic, a suitable design approach is needed. The Vision in Product Design (Hekkert

and Van Dijk, 2011) method (referred to as ViP) fits this assignment. It challenges the designer to design for the future by understanding both variable and static context factors.

This approach depends on first, understanding the current user and product context, then, creating a future world based on trends, developments, states and principles, and after that tying the context factors into a coherent vision of the future.

The method rests on three fundamental principles:

- A designer's job is to look for possibilities and possible futures, instead of simply solving present day problems.
- Products are meant to accomplish or develop appropriate interactions. They get their meaning in interactions with people. Hence ViP is interaction centered.
- Appropriateness of an interaction is determined by the context it is designed for. Thus, ViP is context-driven.

These principles imply that the designer should not just create new products, but re-imagine new products for the future he or she believes will come to pass. Thus, the designer is an active participant in creating a new future.

Solving today's problems can lead to products which get the job done. However, these products are me-too products. As mentioned by Verganti (2009), many companies push technology but are not able to truly innovate. The key message is that radical innovation can be achieved by changing the meaning of the future product. This is visualized in **Figure 2**.

A design driven approach leads to original solutions. This is at the intersection of technology push of radical improvement and design-driven generation of new meanings.

Thus, in this project I focus on creating the new context and thus a new meaning for the users of the future. I follow the key guidelines offered by Hekkert and Van Dijk (2011) to create a rich and original context which integrates principles from all the key pillars of the IDE department at TU Delft - human, business and technology. The overall ViP approach is outlined in **Figure 3**.

The ViP method stresses creating new meaningful relationships between the user and the context before designing the new product. After creating the future context, I define the human-product interaction and then the product qualities before offering the concept and detailed design.

To understand the users, I use literature study and semi-structured interviews with entrepreneurs and accountants. I also undertake informal conversations with stakeholders within Exact to understand the business context better. The user research aims to uncover needs which can inspire and guide creation of context and concept. Similarly, to understand technology trends, I conduct literature study as well as semi-structured interviews of experts in the field of emerging technologies. This research helped in uncovering potential applications of the technologies as well their limits. I hope this research will not only aid in creating an appropriate concept, but also guide managers at Exact in deciding which technologies to invest in.

A designer's job is to look for possibilities and possible futures, instead of simply solving present day problems.

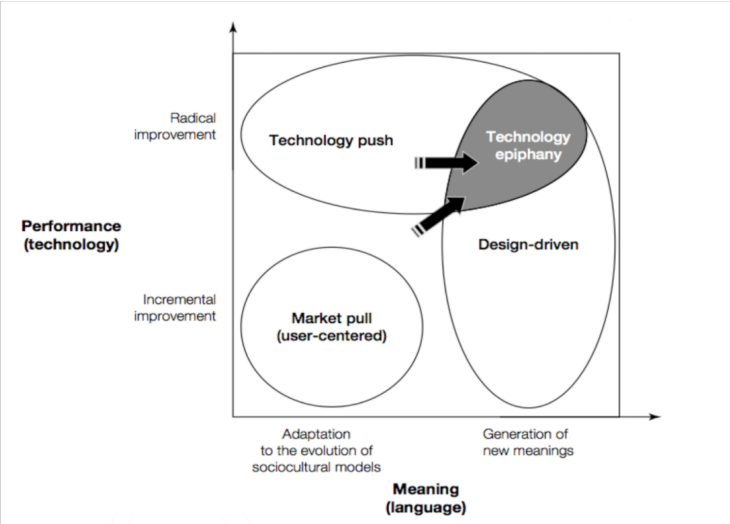

Figure 2. Design Driven Innovation

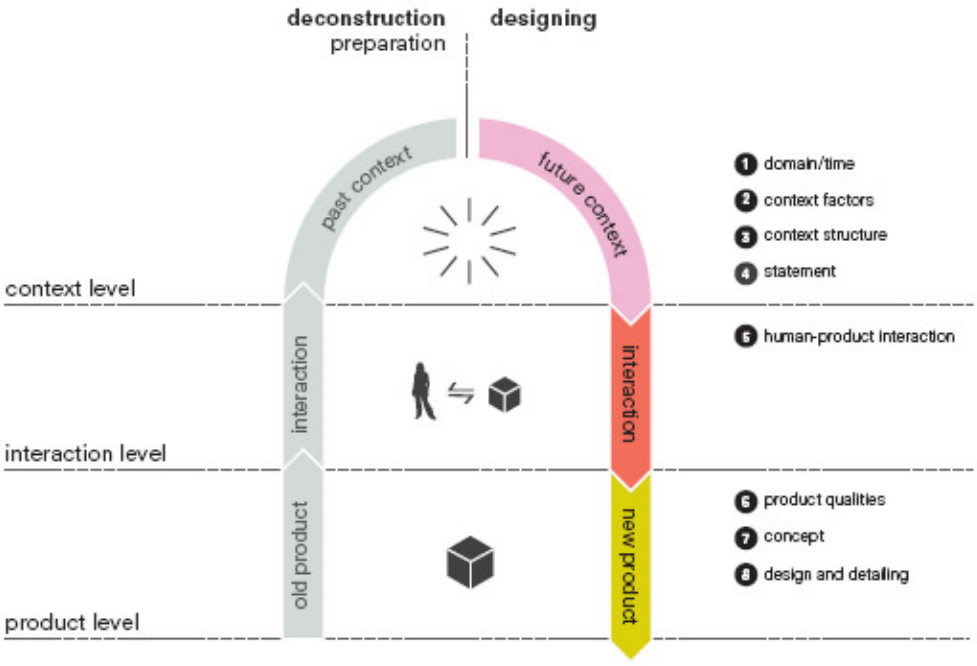

Figure 3. Vision in Product Design

CHAPTER 2

Background

Accounting progresses hand in hand with changes in **technology.**

In this section, we look at multiple areas to develop a basic understanding of the background, that is, the current context. We will look at a brief history of accounting, the strategy and organizational overview of Exact alongwith a view of the competition.

2.1 Accounting, a brief historical note

"The farther back you can look, the farther forward you are likely to see."
- Winston Churchill

The field of accounting has existed since the age of Renaissance. Called the "language of business", accounting measures the results of economic activities of an organization, and helps in communicating these activities to stakeholders such as investors, regulators, creditors and management (Department of Accounting, Foster School of Business, 2013). Accounting since then has evolved with the rise of professional accounting, with its various sub-branches like financial accounting, management accounting, auditing, taxation, and accounting information systems (Weber and Stevenson, 1981).

While accounting has evolved in terms of functionality, the practice of accounting has also evolved with advances in technology. While the earlier centuries used pen and paper (and other physical objects before that; Henlo (1992) tells that the rise of accounting was correlated with rise of writing itself) , and thus a lot of manual labour, the 20th century saw the dawn of the computer and thus remarkable gains in the speed and effectiveness of accounting. The first time a computer was used for accounting was in 1955, called the UNIVAC I, and was used by GE in the USA (Scott, 2015).

This was a step forward from a lot of people carrying stacks of paper, but it was still very cumbersome and expensive by modern standards. In the 1960s, companies invested in creating computers customized for their specific needs. The computers cost hundreds of thousands of dollars, and some tasks took up to 40 hours to run (Scott, 2015). The computers weighed in tons and took a lot of electricity - enough to power a small town. But even with such dramatic costs, they were preferable over having a lot of clerks who had to check the work by hand.

By 1970 and the early 1980, the computer started to become "personal" and this led to generalized software solutions with flexible components (Scott, 2015). This also heralded an advance in user interface and interaction of these complex systems. With advances in hardware, the machine costs also came down, with accounting solutions costing in thousands of dollars, an exponential cost reduction from the 1950s. The user interfaces advanced further with the development of word processing and spreadsheet applications for personal computers. One of key products of this time was Quicken, launched by industry giant Intuit (Scott, 2015), which had an accessible user interface. This product expanded the potential market further.

More recent advances in usage and usability have also evolved with new operating systems, and devices carrying the operating systems. While the earliest software tools were developed for DOS, later came Windows and Mac OS, to the current iOS and Android, and possibly voice based OSes like Alexa will be the future.

In summary, this brief history illustrates some key trends in accounting. Manual labour is reducing, costs of machines is decreasing, user interfaces are being improved and business models are evolving - from a fixed price to a service based subscription model.

However, the technological revolution has a long way to go. Advances in Artificial Intelligence (AI), Cryptography, and Natural Language Processing (NLP) are enabling products which were limited to science fiction novels. As these technologies push forward, they will impact how we live and work.

2.2 Exact Software - The Dutch Accounting Giant

Introduction

Exact Software was founded in 1984 in Delft, right when digital accounting was taking off. Today, Exact has operations in 15 countries, a customer base of around 400,000, and annual revenues to the north of 230 million euros (H. Wellema, Personal Communication, 2017). Exact has been successful in keeping pace with the evolution in technology. While their first product was a DOS based solution, they now have their key product Exact Online (EOL) delivered through the cloud using a Software-as-a-Service (SaaS) business model (this model is explained in **Appendix A6**). EOL is available on the browser, as well as a mobile app and even on the Apple watch.

In 2014, Exact was acquired by a British Private Equity (PE) firm Apax partners for € 730 Million (Dorbian, 2015) and delisted from the NYSE Euronext Amsterdam stock exchange. With the expertise and financial backing of Apax partners and more independence as a private firm, Exact aims to be the top 3 global player for cloud business software (Dorbian, 2015).

Strategy and Organizational Overview

Exact develops industry specific software and offers them on-premises, or through a SaaS based business model for a wide

variety of industries (Exact, 2014). To address the opportunities presented by opportunities in the market, namely mobile and cloud, Exact is focusing on its cloud based offerings - namely its Exact Online (EOL) suite of products. These solutions are available for multiple industries and verticals, and for both SMEs and Accountants.

Exact has three categories of solutions:

1. Business Solutions - for the value market
2. Cloud Solutions - for the volume market; this is the strategic focus
3. Specialized Solutions - for the value market (this unit was sold off in August 2017)

These will be clearer with the understanding of target market segments.

Target Market Segments

Exact broadly divides its market into 2 segments - the value market and the volume market. These are shown in **Figure 4**.

The volume market is made up of Small & Medium Enterprises (SMEs) which have up to 100 employees. Several key characteristics of this market are:

- Strong connection with Accountant
- Limited in-house IT resources
- Preference for single-vendor relationships
- Less complex Business Processes
- Demand for solutions which are easy to implement and easy to use

Exact is well-positioned for this market because of their deep expertise in serving these customers. Exact has a deep and broad cloud based online portfolio to serve this market.

The value market, on the other hand, is made of small and medium sized businesses which have between 50 to 500 employees. Some features of this market are:

- Complex business processes - hence a need for customizable solutions
- Specific industry requirements
- Implementation can be on-premise or SaaS based

Exact's edge in this market is configurable Enterprise Resource Planning (ERP) solutions and deep industry knowledge. The revenue streams in this market are an initial one-time license purchase and recurring maintenance revenue. For implementation projects, Exact also receives service revenue. However, in this segment too, there is more demand for SaaS based models, thus the revenue model is going towards Monthly Recurring Revenue (MRR).

Research and Development Focus

In line with solid trends towards cloud services, mobility and user experience, Exact wants to focus resources on these areas. To make sure they bring innovative products to the market, they depend on 2 key factors:

- Product Marketing
- Research and Development

Effective product marketing focuses on scanning the market for new trends, technologies, and user needs and translating them into the product proposition. Product marketing also works on reducing the time to market for new products, this maintaining competitiveness. Meanwhile, high quality R&D stresses on integrating technological innovations in Exact products, delivering solutions on time, and optimizing output from resources.

A Culture of Innovation

Exact has invested in three in-house startups to stay ahead

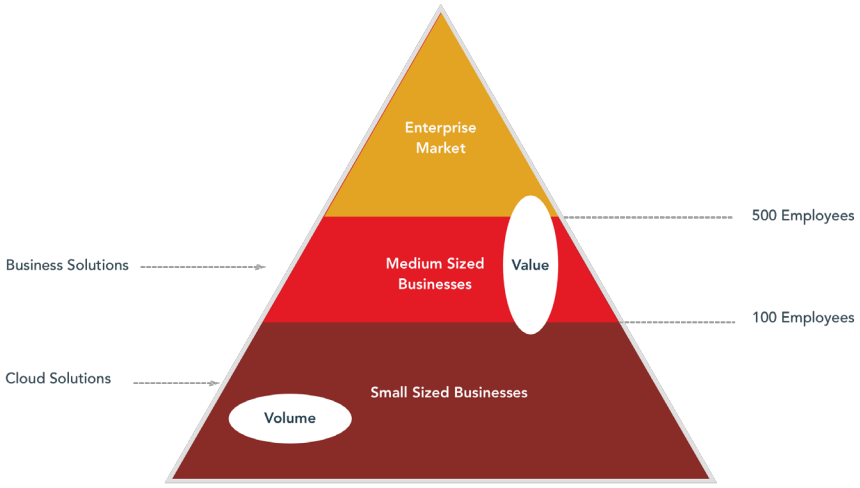

Figure 4. Exact's Market Segments

in developing innovative products. These startups can take advantage of the Exact brand and financial resources to create new innovative products. At the same time, these startups can move fast, using a lean startup methodology and be unencumbered from the current systems and products in the company.

These startups are Exact Go, Exact Connect and Exact Finance.

Exact Go - This product is built to cater to the Spanish Market. Exact sees Spain as a possible growth area for an android based app for freelancers.

Exact Connect - This is built as a platform to connect entrepreneurs with accountants. The entrepreneur can put in his or her needs, and the platform finds the right accountant to fulfil those needs. This could be a major avenue for creating value and even global accounting players like Intuit are investing in such platforms (Intuit Product Manager, Personal Communication 2017).

Exact Finance - This product is built to fit the financial credit needs for SMEs. It acts as a platform to connect SMEs to financing bodies. A credit score is calculated for the SME using their data from their EOL account. This finance score can then be used to apply for credit to more than 20 investors.

Apart from these, Exact holds regular Global Hackathons and Tech Talks to diffuse knowledge about technology based initiatives within the company.

Competition Overview

The big companies Exact sees as its key competitors at a global level are Intuit, Sage and Xero.

Intuit - Founded in 1983, Intuit is one the biggest players in accounting software with a dominating base in the USA. It has more than 4 Billion Dollars in revenue and cash reserves of over a billion USD (Intuit Inc., 2016). Their Quickbooks product is geared for cloud accounting market.

Sage - Founded in 1981, is another global player with headquarters in the UK and a very strong financial position. Their 2016 global revenue was over 1.5 Billion Euros and they have more than 264.5 Million Euros in cash assets (Sage Group PLC, 2016) . It provides products for all levels of the market, from startups (with 1 to 10 employees) to Enterprise (for more than 200 employees).

Xero - Xero is based out of Australia, and while it is a much smaller player globally, it is seen as a serious competitor due to quick growth (it was founded in 2006) in these markets. Xero has a visually appealing user interface and even positions itself as 'Beautiful Accounting Software'. Unlike the other players, Xero is fueled by Venture Capitalists (Drury, 2013) and thus able to grow (by aggressively investing in Sales and Marketing) even while sustaining losses.

Key numbers of these competitors are shown in **Table 1** below.

Company	2016 Revenue (Millions)	Operating Profit (Millions)	Margin	Cash Assets (Millions)
Intuit	$4,694	€979	20.8%	$1,080
Sage	€1,569	€300	19.1%	$264.5
Xero	$207	-$60	-	$39

Table 1. Exact's Competition

We can conclude the following from looking at these figures:

- **Most accounting players have a geographic focus.** Each big player dominates in a specific region. Intuit in the USA, Sage in UK, and Xero in the Australia and New Zealand (ANZ) region. Similarly, Exact has a dominating presence in the Dutch market.
- **Big accounting firms are old and cash rich.** Intuit, Sage, and Exact all started more than 30 years ago, and are cash rich with around 20% profit margin. This implies that they are hard to attack in their home markets.
- **It is still possible to grow in tough markets.** Xero grew in the ANZ region even with strong incumbents. One of the differentiators of Xero has been its focus on User Experience. The brand is positioned as 'Beautiful Accounting Software' - to underline this. However, this growth has short term costs, reflected in losses seen on Xero's balance sheet (Xero Ltd., 2016).

Thus, if Exact invests in customer focused experiences in other geographies, and is ready to take some losses on the short term, there is a good chance of penetrating other geographies outside the Netherlands. To some extent, Exact is doing this with it's Exact Go product for the Spanish market.

Apart from these global players, within Netherlands, Exact competes with the following players in the cloud solutions space:

- AccountView
- Twinfield
- Unit 4
- SnelStart
- Multiverse
- reeleezee

However, Exact has a dominant position in the Dutch market, and is looking to expand in the European geographies, like Spain and France, before trying to win in the UK and other

markets (R. Dahne, Personal Communication 2017).

2.3 Understanding Technology Trends and Development

Technology trends can be understood using S-curves or the Gartner hype cycle.

The Technology S-Curves

As mentioned by Christensen (1992), the technology S-curve (shown in **Figure 5**) is a centrepiece in thinking about technology strategy. This curve describes how the product or process performance varies as the technologies become more mature with more time or more engineering effort. In the first few time intervals, technologies seem to grow at a slower rate, as the fundamental concepts are worked out.

As the technology becomes better understood, controlled and diffused, the rate of improvement of technology rapidly increases (Sahal 1981). This phase is marked by rapid innovation, and feature expansion (Evans 2017). Finally, the growth seems to reach is asymptotic limit as the technology becomes more mature. This 'flattening out' maybe due to the technology facing its natural or physical limits, as mentioned

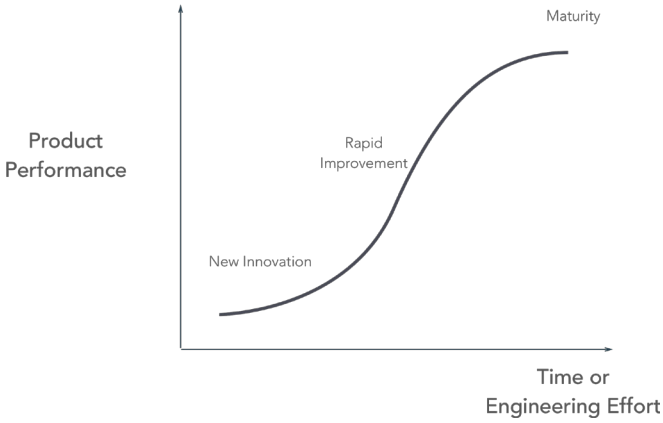

Figure 5. Technology S-Curve

by Christensen (1992), or it may be due to maturation of the market.

As suggested by Foster (1986) and Becker and Speltz (1983), to develop its competitiveness, a firm should identify when its technologies are reaching maturity, and identify new opportunities which might be related to the current ones. These new technologies can take off at the time when the current technology is slowing down.

In essence, they urge strategists to ensure that the firm follows a dotted line as shown in the **Figure 6**. This puts an onus on the firm to keep researching new technologies and see how they can be adapted to the firm's current suite of products. According to Dahne (Personal Communication, 2017), Exact has been able to do this successfully in the past, while moving from a DOS based solution, to Windows, to the Cloud.

According to Evans (2017), PCs (Personal Computers) reached a matured stage in technology quite some time ago, and now smartphones are also starting to become mature. The mature status of smartphones as a technology implies that now they

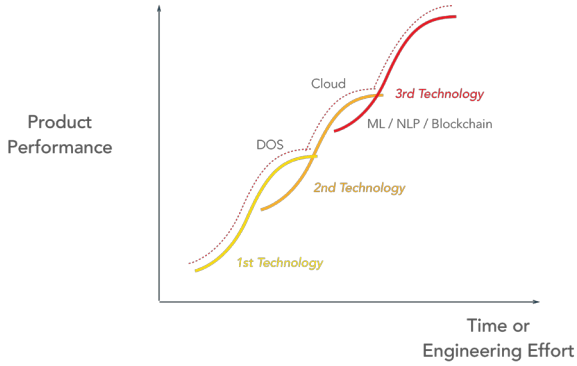

Figure 6. Multiple Technology S-Curves

can be used as a clear, solid platform for further innovation. For Exact, we can say that DOS and Windows based platforms were the first technology, which are now mature. Currently, cloud and mobile can be seen as the second technology which is nearing maturity.

For the future, Exact is looking forward to mainly three technologies - Machine Learning, Natural Language Processing (NLP), and Blockchain. Exact has decided to invest in trying out the applications of these promising technologies and has already implemented Machine Learning for some specific use cases. A beginner level understanding of these technologies is provided in **Appendix A7**.

The Gartner Hype Cycle

Apart from the technology S-Curve, the Gartner Hype Cycle (Linden and Fenn, 2003) is another useful way to look at developments in technology. This is shown in **Figure 7**.

According to the hype cycle, a new technology advance triggers innovation, and the technology becomes hyped up very fast, reaching the peak of expectations in a very short time. After some time is passed, expectations fall as the innovation fails to reach up the promised hype. At this stage, there is 'disillusionment'. As more time passes, the real, authentic applications of the technology become visible, in the

'slope of enlightenment', and finally the technology reaches a steady state of performance. This plateau is analogous to the maturity stage of the S-curve.

In 2017 (Panetta, K., 2017), the hype cycle of technologies looks as shown in the **Figure 8**.

According to this research, Machine Learning and Conversational User Interfaces (which are an application of NLP) will reach the 'Plateau of Productivity' in 2 to 5 years, while another relevant technology is the blockchain, which should become mature in 5 to 10 years. Hence, to maintain a competitive advantage in the market, Exact needs to invest and experiment with these technologies now, to be ready when they reach the productive stage.

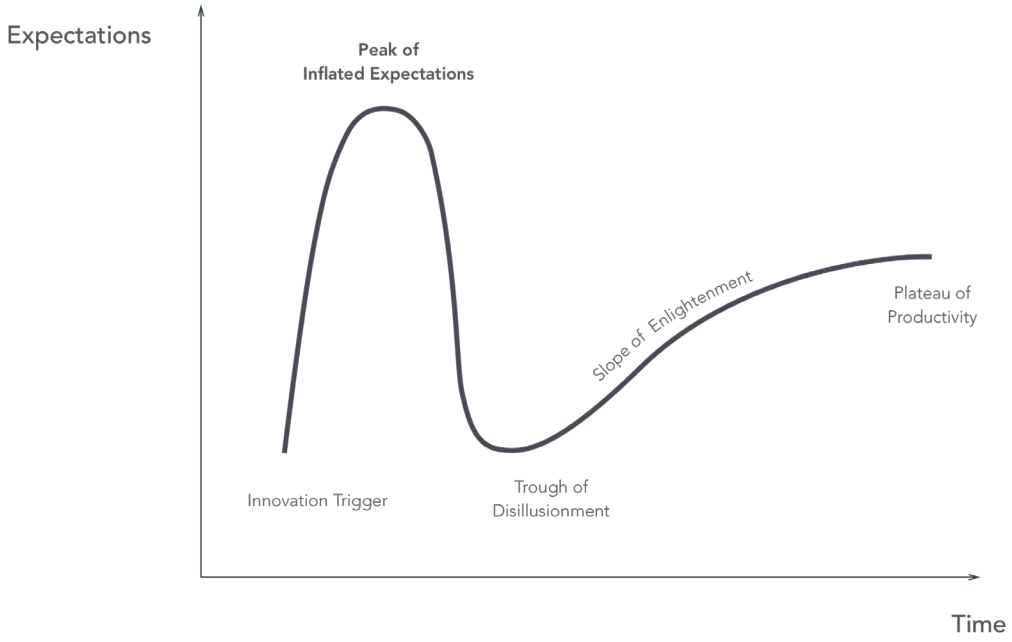

Figure 7. The Gartner Hype Cycle

Conclusion

In this section we saw how accounting has evolved with technology, who are the globally dominant players and what are the next big trends in technology. Accounting is becoming more automated, new interfaces are making tasks easier, and technology and user experience are emerging as drivers of competitive advantage. While it is exceedingly difficult to dislocate incumbents, it is still possible. If Exact is able to launch technically advanced products with delightful user experience, there is much higher chance of growing in competing geographies as well as defending its home market.

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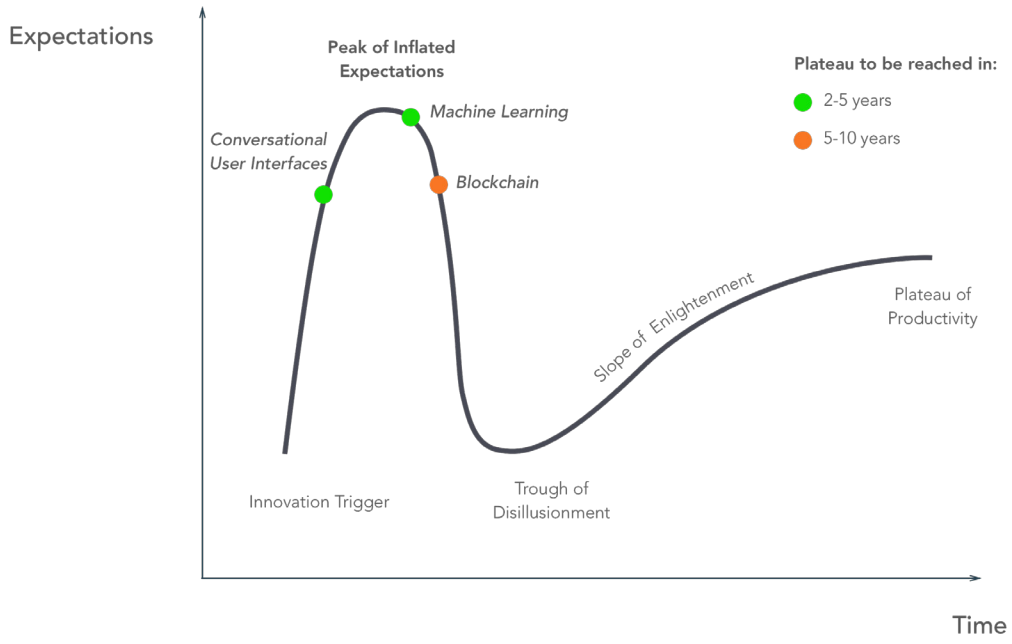


Figure 8. The Gartner Hype Cycle for 2017

CHAPTER 3

Research Method

Interviewing, filtering and putting **insights on a wall.**

Being design driven implies making products which fulfil the user's needs in a novel way. Not only the needs which they can articulate, but the needs they might have, but do not know they have. As mentioned in the introduction, the design-driven ViP approach was chosen to create the right product for the future. The key part of the ViP approach is the generation of context factors. To yield the most original results, the context factors should be (Hekkert and van Dijk, 2011):

- Taken from diverse sources
- Personally appealing to the designer
- Relevant to the domain
- Exhaustive - to cover as many possibilities as possible

However, while the ViP approach does not mention detailed contact with users, I believed it was necessary to hear from them directly to uncover their underlying needs. To understand technology's most promising applications, I read literature and interviewed experts from academia as well as the professional world to get a clear and exhaustive view of the possibilities. The outcomes from these are presented in the next chapter.

After initial discussions with Product Marketing Managers at Exact and previous research done (Exact Internal documents, 2016), it was decided out that the domain (outlined in **Figure 9**) should be the relationship between entrepreneurs and accountants. There was a conscious choice to not focus on just entrepreneurs but on the entrepreneur-accountant relationship because:

- Accountants are a key customer segment for Exact.
- Communication tools between accountants and entrepreneurs frequently lead to misunderstandings.
- Improving their collaboration can lead to opportunities to add value for both of them.
- Accountants are aware of possibilities and challenges of technology and want to be ready for the future.
- Accountants and Entrepreneurs share a personal bond.

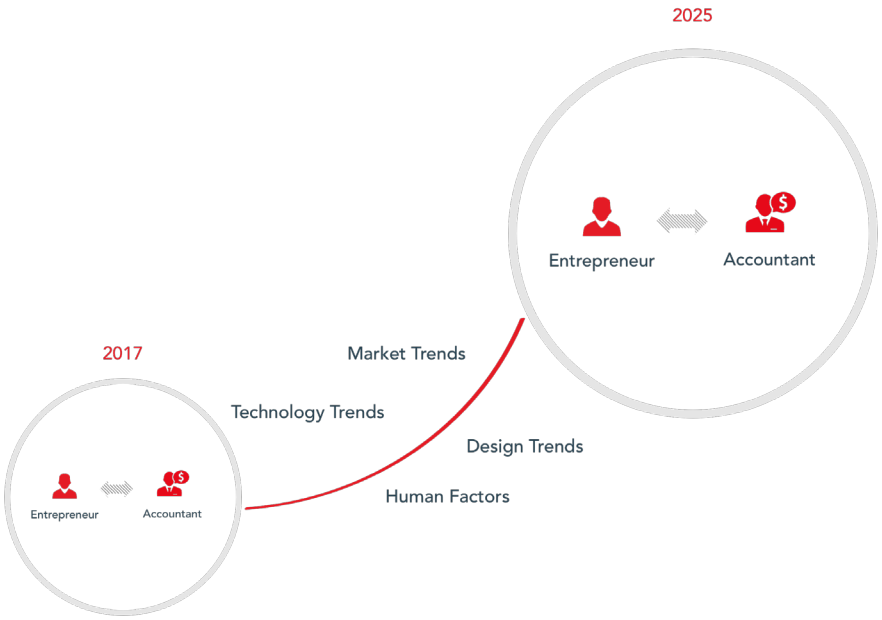


Figure 9. The Domain of the Project

The time horizon was taken as eight to ten years because this would enable the designer to take more liberties with the development of technology as well as make the domain more broadly open for new ideas.

3.1 Research Questions

To address this domain and in accordance with the goals of the project (as mentioned in the Introduction), the following research questions were articulated.

Develop an understanding of key motivations of entrepreneurs

- What are the core motivations of entrepreneurs? Why do they start businesses instead of working in traditional careers? How do they define their vision?
- What are the day to day challenges and worries of

entrepreneurs?
- How do entrepreneurs deal with a complex world with a lot of information? What methods do they use to filter out noise? How do they identify opportunities?

Develop an understanding of accountants in terms of what value they provide and what challenges do they foresee

- What are the unique selling points for accountants?
- How do they ensure they deliver high value services?
- What are the biggest challenges to their business?
- How are accountants preparing for the future?
- What is the attitude of accountants towards technology?

Develop an understanding of how entrepreneurs and accountants interact and relate to each other, and identify how it can be improved

- What keywords capture the relationship?
- How often do entrepreneurs and accountants communicate?
- What are the preferred modes of communication?
- How do entrepreneurs choose their accountant?
- Which kind of occasions highlight disproportionately high value added in the relationship?

Develop an understanding of key technologies and their applications, and identify opportunities to use them for Exact's customers

- How does machine learning work? Why is it important?
- Which current products are using machine learning in the best way?
- Which parts of machine learning, though promising, are not practically feasible?
- What are the limits of NLP? By what time-frame can complete NLP be achieved?
- How are businesses of today utilizing these technologies for competitive advantage?
- What are the most promising avenues for new technologies?
- How can Exact leverage these technologies for a better user experience for their customers - both SMEs and Accountants?
- What business opportunities and challenges might result from the development of blockchain technology?
- What are the broad trends which are driving the growth in these technologies?
- What are the social and regulatory challenges of new technologies and how are they addressed?
- Can increasing automation lead to loss of jobs for accountants? What opportunities and threats might be offered by new technologies for the accountants and the entrepreneur accountant relationship?

3.2 Semi-Structured Interviews

The study had 18 Semi-structured interviews with internal and external participants. I conducted interviews to collect context factors deeply rooted in the users' context. As mentioned by Burgess (1984), qualitative interviews are "conversations with a purpose". The conversational format of interviews gives the information collection task more flexibility. This was also the case in my experience. Especially with the expert interviews where I could update the questions with new knowledge gained from previous interviews. However, this was also time consuming - both in terms of conducting the research as well as finding willing participants.

As mentioned by Patton (2002), the semi-structured interview design uses an interview guide approach. It consists of fairly open questions, with a guide to cover different topics. I used this approach for all the interviews. The actual questions varied slightly according to the audience. As mentioned by Ghauri, P. N., & Grønhaug, K. (2005), first, an understanding of the research problem was reached, then the possible participants were brainstormed, a draft interview guide was prepared, it was then tested and refined with feedback from Boschman (Personal Communication, 2017).

Almost all interviews were taken in-person at the office of the interviewees. This also helped me in looking at the physical context in which they work. For example, the offices of accountants looked very different than the offices of entrepreneurs. The accountant offices gave an air of richness and luxury with leather seats and imposing furniture, probably aimed at making their clients feel comfortable. However, the entrepreneur offices gave a feeling of efficiency and speed. For a few interviews, Skype was used as visiting the interviewee office was geographically not feasible.

I purposefully tried to stay away from discussions of any accounting software they were already using. The focus as defined in the domain, was on their motivations and their relationship, and not on their current tools. Also, as suggested by Patton (2002), the interviews contained open-ended questions asking the respondents to tell stories, situations and examples. These questions resulted in a rich, insightful responses which could be used for product ideas.

For the experts, the same semi-structured interview approach was followed with the crucial difference that most interviews were customized for that specific expert - because of their expertise in different fields relevant to the future of technology

and accounting. The aim of these interviews was to understand their views on the future of technology, society and business.

Reaching out to Entrepreneurs and Accountants

According to Morse (1991), when obtaining a purposeful sample, the researcher selects participants according to the needs of the study. To get broad context factors, as well as diverse viewpoints I reached out to entrepreneurs and accountants who were both customers and not customers of Exact's products. This would expose the research to more diverse viewpoints.

Reaching to Exact's customers was a daunting task for many reasons. One, it was difficult to get their contact details within the company. The customer data is important and thus protected and hence it's not easy to get hold of it. Second, it was vacation period (in July, when the project started full-time) and hence most customers were not available, and some were just not willing to spend time on it. Lastly, some of the customers were not comfortable interviewing in English.

I used multiple strategies to get the customer contacts data. First, I contacted the existing UX team members to get these details. From this customer base, I sent out more than 25 e-mails to Entrepreneurs (written in Dutch), asking them to participate in the study. The mail body is present in **Appendix A9**. The mail was designed with members of the Exact UX team to elicit responses. However, I did not receive any response.

Next, I reached out to personal contacts in India as well as in The Netherlands, who were entrepreneurs themselves, and started the interviewing process. At the same time, I started to collect more information from the Customer Success department at Exact and got more customer contact data - in form of names, addresses and telephone numbers. This time, instead of e-mailing, I called them. This had the distinct advantage of iterating with scripts. When getting negative responses, I was able to discuss those with colleagues at Exact, and refine the scripts for the next call. Based on these strategies, I was able to get 2 interviews after more than 20 calls.

I also reached out to entrepreneurs at Yes Delft!, the startup incubator of TU Delft, and mailing 15 entrepreneurs helped me in getting 2 respondents.

For reaching out to accountants, I used the data from Exact's 'Innovation Panel' - this is a separate set of accountants who are active participants in helping Exact develop and test their products. Since these accountants are willing participants in these kinds of research, I was able to get 3 respondents after making 8 calls.

In the end, I had a rich set of customers across nationalities, business structures (startups as well as agency businesses) and industries. Since the domain and the interview questions were broad, this set helped me in gaining a triangulation of perspectives for the research questions. However, the accountants were pretty homogeneous.

Reaching out to Experts

For the experts, it was important that they have a solid background in technology. Initially, I looked at professors at TU Delft and selected those who were researching the applications of technology to society - most of them being part of the TPM department at TU Delft. One sample e-mail is provided in **Appendix A9**. However, here too, I was able to secure only 1 response after around 8 emails.

However, I was able to find 2 technology experts within Exact itself who had rich insights about the applications and potential of machine learning and blockchain. Both of them had PhDs from TU Delft.

I was also able to reach out to Experts from my personal network. One of them being a data scientist at a renowned German company, the other being a Vice President at a Venture Capital firm with offices in USA and India. Finally, one expert was a Product Manager for a competing accounting firm (Intuit). This resulted in a rich and diverse set of sources for investigation, because:

- The experts were **both within and outside Exact**. The insiders could give more insights about how Accounting could benefit from new technologies, while the outsiders were more neutral and general.
- The experts were **both from academia and industry**. While the experts from academia could give a social and regulatory perspective, the people from industry could tell more about business and competitive dynamics in relation to technology.
- The experts had **both a research background as well as a business background**. While most had a research-oriented background and training, two of them had a business background. One was a Venture Capitalist and the other a Product Manager.

The Expert Profiles are as follows:

- **Expert 1**: Asst. Professor in Institutional aspects of Information and Communication Technology (ICT) at TU Delft.
- **Expert 2:** Tenured Researcher on Computer Vision. PhD from University of Genoa in Italy, now working with Exact as Senior Data Scientist
- **Expert 3:** Vice President at a Venture Capital firm, with experience in Private Equity and Quantitative Finance
- **Expert 4:** Data Scientist at a German Retail firm with

a PhD from EPFL, Switzerland.

- **Expert 5:** Machine Learning PhD Candidate at TU Delft, working with Exact as Senior Research Engineer
- **Expert 6:** Global Product Manager at Intuit, the American Accounting Market leader
- **Expert 7:** Divisional Director of Technology at Exact Software Headquarters in Delft

Apart from these experts, I focused on detailed study of three key books on Technology and Human factors, as these would give a better all-round understanding of the context.

I also tried to classify it as a state, development, trend or principle according to the ViP method.

At the same time, I kept highlighting the factors which seemed especially interesting. Also, for those factors which were personal beliefs or opinions, I noted the source as 'self'. As mentioned in the ViP approach, adding personal factors can lead to more original solutions. A snapshot from collection of these broad factors is shown in **Picture 1**. This classification and highlighting of factors helped me in filtering them down later for final analysis and synthesis.

142	Blockchain will replace networks with markets	Development	Naval Ravikant	Business
143	Adding a new participant in a network adds value for all participants of a network.	Principle	Self	Business
147	We aggressively filter information - hence some important stuff gets left out.	Principle	MPC	Human
148	We fill in the gaps when we see a lack of meaning, these gaps can be flawed	Principle	MPC	Human

Picture 1. Coding the Context Factors

I also used the information from these books to ask better questions to the experts. The details of these books are given in **Appendix A8**.

3.3 Capturing Information

During all the interviews and literature search, I maintained a list of potential broader context factors which seemed appealing and informative. I did this to ensure I did not miss anything interesting, even if it seemed trivial at the moment. I captured each factor in a sentence and noted down its source.

The approach was inspired by the grounded theory method of qualitative research. As mentioned by Strauss and Corbin (1997), this approach depends on deriving results inductively from studying the phenomena occurring in the world. It is based on reflecting on the phenomena and codifying them. In this case, the phenomena were codified initially using the ViP approach of State, Development, Principle and Trend, and later into codes of Human, Business and Technology.

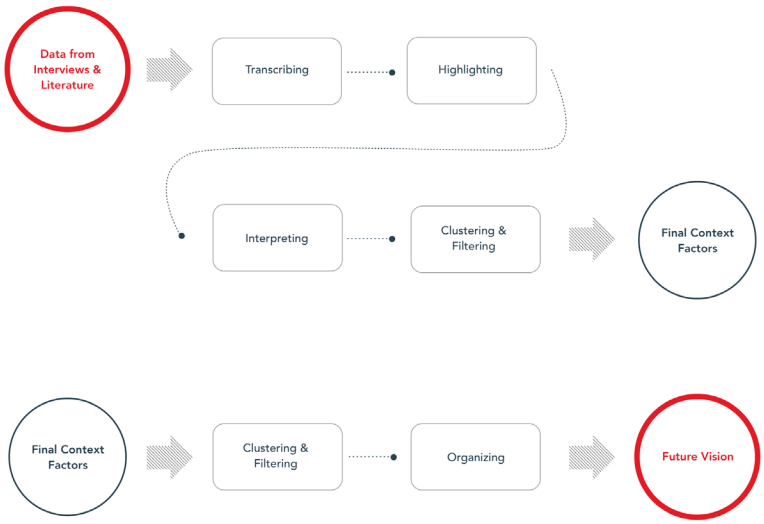


Figure 10. Overall Analysis Approach

3.4 Analysis Approach

The broad context factors were then clustered and interpreted into the final narrow list of context factors. Then the final context factors were further clustered and organized and lastly tied into a coherent vision of the future. This process is outlined in **Figure 10**.

The first phase of narrowing down was done by building the final list of context factors one by one. First, the most appealing broad factor was captured into the list of final factors. Then, using filters on sources and types, other broad factors were looked at, to see which ones were related and hence could be clustered together.

The whole process was iterative and it involved -

- **Combining Broad Factors:** Similar or redundant factors were clustered into a bigger whole. For example, broad context factors like 'Entrepreneurs do not want to wait for answers', 'Accountants want the documents in time', 'Real time is more important than quality' were clustered into: 'People like to receive information in real-time'.
- **Filtering out Broad Factors:** Many factors were removed because they were either too obvious (for example, 'Entrepreneurs are concerned with Sales'), or, on reflection, not very relevant to the problem at hand (for example, 'In manufacturing, production costs will become lesser than transportation costs').

This process gave a shorter list of context factors which were further refined according to the multiple criteria. This process was also iterative. The criteria are explained below.

The first criterion was personal appeal. Each factor should be personally appealing. As mentioned in the ViP method, the designer should find the context factor interesting. I chose the factors which had personal appeal or meaning.

Next, I focused on the human causes of technology. Factors were shaped according to underlying human needs as inferred from technology trends. For example, 'Natural Language Understanding (NLU) is a hard problem to solve', was modified to 'Human language is rich with emotion, sarcasm and context'. This is because the human nature of the language is what makes NLU a hard computer science problem to solve.

Figure 11. From technology factors to human factors

Hence, in this case, the context was articulated as a human factor instead of a technology factor. This is shown in **Figure 11**.

This was not just for the technology based factors. I tried to see what is the human cause driving every factor. For example, 'People are getting interested in digital currencies' and 'Digital

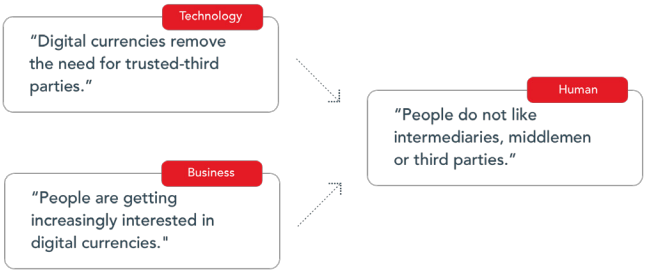


Figure 12. Combining factors

currencies remove the need for trusted-third parties' was combined to 'People do not like intermediaries, middlemen, or third-parties.' This is shown in the **Figure 12**.

It is important to note that **this process had the designer's interpretation involved.** For example, people's increasing interest in digital currencies may also be due to their curiosity about it, or their desire to speculate or some other reason.

Further, I tried to simplify the language by translating jargon into simple and understandable sentences. For example, the well known 'anchoring effect' from cognitive psychology was rephrased as 'People give much greater importance to the first

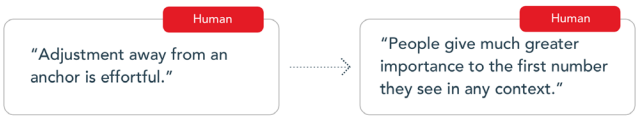


Figure 13. Simplifying factors by removing jargon

number they see in any context'. This is shown in **Figure 13**.

Finally, I tried to frame some of the factors as precise cause and effect relationships by getting to the root cause. For example, 'Entrepreneurs never have enough time' was rephrased to 'Entrepreneurs feel they never have enough time for strategic work.' This is shown in **Figure 14**.

This was done to clarify the reasoning behind a given factor and hence potentially open up a direction for solution. This also had some element of interpretation from the designer's perspective.

After obtaining the final list of factors in this way, they were

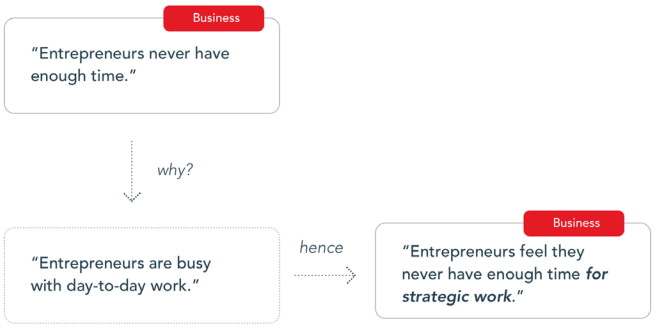


Figure 14. Going to root causes

then arranged into meaningful clusters. Every context factor was captured on a post-it note and stuck on the wall. Wherever there could be a image or icon drawn to represent the factor, it was done (shown in **Figure 15**) because the visual captures more information and is thus easier to read on a wide wall.

Like all other stages, this process was also iterative. Many clusters were created and discarded. The clusters emerged from looking at them on the wall. Different shape (and color) of post-its was used to denote the context factors and different shape was used to denote the emerging clusters.

Figure 15. Converting factors to visuals on post-it notes

This arrangement gave an overview and the connections and relations could be identified by playing with the post-its.

After arranging the clusters on the wall (shown in **Picture 2**) using post-its, I also tried to tie the clusters into a coherent vision by drawing sketches on flip-charts. Here I was able to zoom in on the clusters with the context factors abstracted away inside them. This was helpful in simplifying the future context and seeing and articulating the vision by linking the clusters to each other in a meaningful way. Initial flip-chart is shown in **Picture 3**.

Like other parts of the process, this also took some iterations. The sketches on the flipchart helped in re-arranging the context factors again. Various combinations and cluster titles were identified by grouping and regrouping these factors. Finally some emergent clusters helped in creating a clearer picture of future context. The process involved not only re-arranging some clusters but also renaming them to capture the essence, importance and completeness of the cluster. For example, the cluster 'abundant world' was re-named to 'exponential world' because not only does 'exponential' capture the speed of change caused by technology, it also can have negative connotations (like exponential complexity) whereas 'abundant' only has a positive connotation.

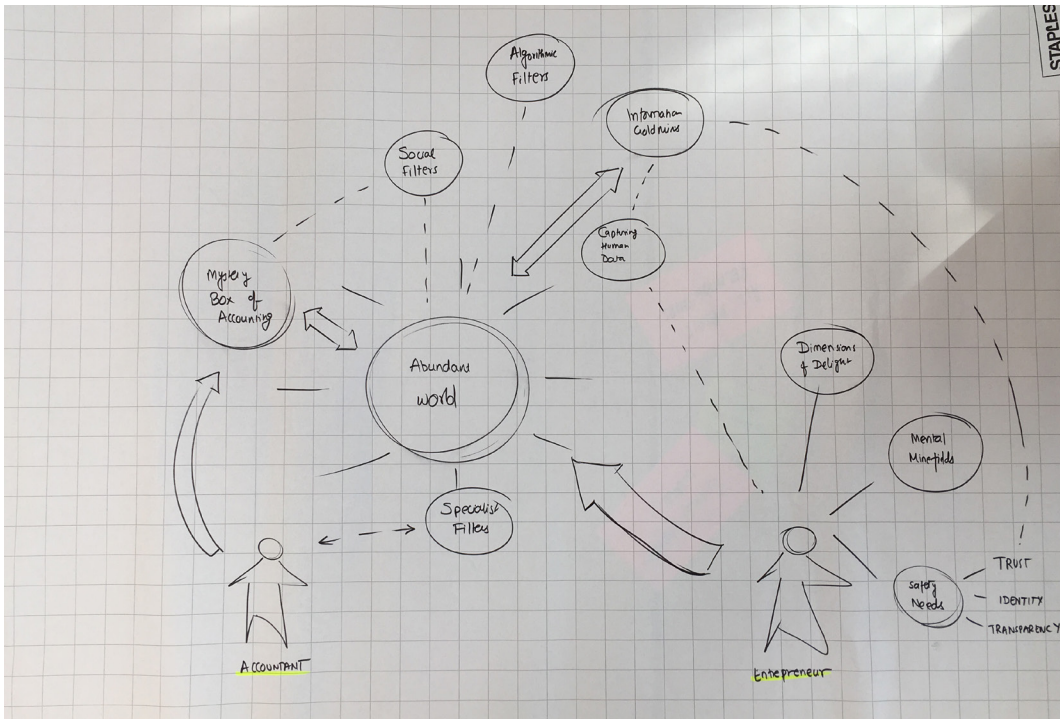
Similarly, the sketching process helped in linking the clusters. For example, in the first iteration, the entrepreneur and accountant are placed at opposite sides of the 'Abundant world', and in this visual arrangement, the relationship between the entrepreneur and accountant was being lost. Re-sketching the clusters helped in connecting them better and trying to bring out the unique dimensions of the relationship. Initially the 'information goldmine' was linked to the 'abundant world', but looking at the entrepreneur-accountant relationship helped in placing the 'information goldmine' as a property of their relationship. This gives a clearer expression to this cluster and opens up directions for creating a product - that is, a product which will be able to utilize information from this relationship to create a better experience.

Similarly, 'mental minefields' were initially seen as a characteristic of the entrepreneur, but on sketching out and reflecting, it appeared to me that this cluster belongs to the exponential world itself, because everyone is affected by these biases, and not just entrepreneurs. Also, as the world gets more and more complicated, the mental minefields become stronger and stronger. This arrangement is shown in **Picture 4**.

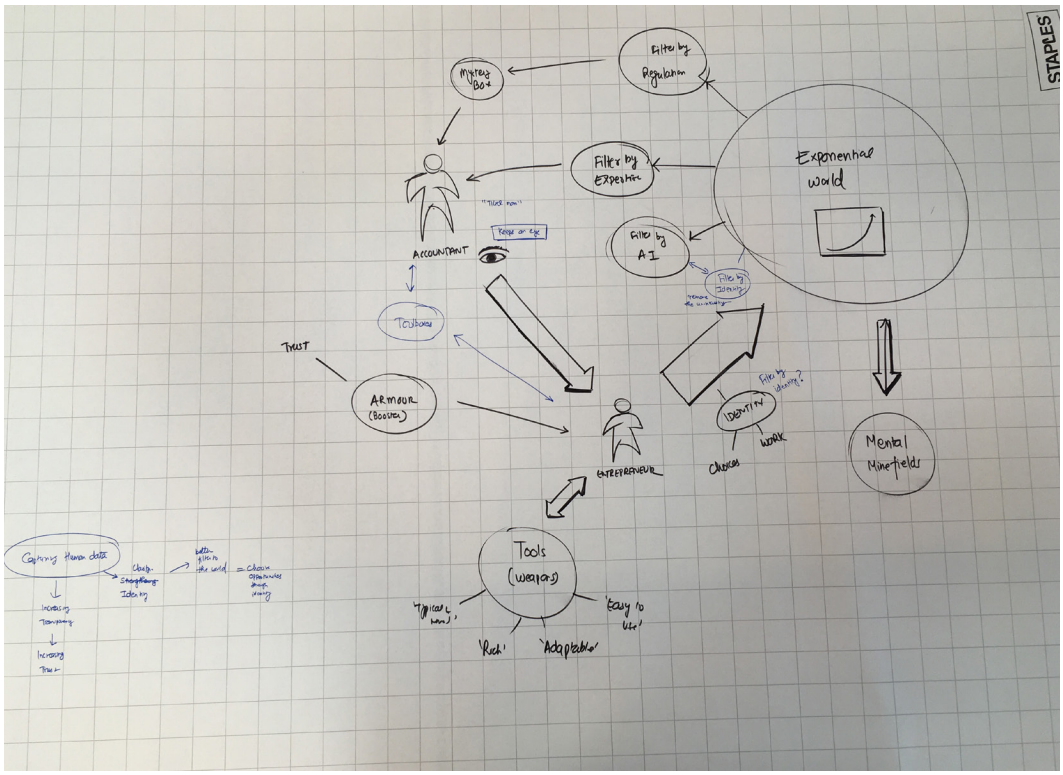
The final context arising from linking the clusters is presented in **Chapter 5**. The purpose of this section was to outline the process of arriving at the final context factors, as well as the process of clustering them into a meaningful whole. The next chapter will explain how the context factors were articulated from the research. The complete list of final context factors is presented in **Appendix A1**.

Picture 2. Post-its on the wall

Every context factor was captured on a post-it note and stuck on the wall. Wherever there could be a image or icon drawn to represent the factor, it was done because the visual captures more information and is thus easier to read on a wide wall.



Picture 3. Initial ideation on Flip-Charts



Picture 4. Later ideation on Flip-Charts

CHAPTER 4

Research Outcomes

Technology moves fast,
but we all long for a
human connection.

In this chapter the key insights from the interviews will be outlined. This will help explain how the context factors were generated from the research.

4.1 Understanding Entrepreneurs' Motivations and Challenges

Entrepreneurs are a diverse group, but one thing clearly stands out. They want to make a difference and an impact. They make a conscious choice to not go for conventional jobs because they value the freedom which entrepreneurship provides. They do not want to work for a boss.

When they talk about the origin of their business, there is an unmistakable link with their past experiences. They tend to start businesses in areas where they are comfortable with people whom they already know. For example, the startup founder of a regional language content platform was himself an avid reader of regional language content since his childhood. Meanwhile, the founder of a design agency used to do the same work as a freelancer. Similarly, they always started the enterprise with people they already knew well. People they were friends with, or they had studied together at their university. This suggests a strong need for approaching the hard life of an entrepreneur with people you trust. Similar power of relationships emerged in their relation with their clients.

"I traveled three times a year and it is hard to do that with a boss. I never really worked for a boss."

Founder, Design Consulting Agency

When questioned about their priorities for their business, a few key themes emerged:

- **Team:** Most of them were very concerned about their team. And the team did not necessarily mean the employees, but also investors. They were very concerned about the people who would work with them. This was especially the case for startup founders who wanted the best people on their team - who also shared the passion for the founder's vision. To make sure the team is productive, founders try to focus on the personal growth of everybody.
- **Customers**: All entrepreneurs were of course concerned about their customers no matter what stage they were in. Newer startups were concerned about finding new customers, while more established businesses were more focused on providing the best experience to the customers they already had.
- **Product**: Some of the founders, especially from startups were very concerned about their product. This is understandable because in the early days, it is not clear what a winning product will look like. This is a complicated process which involves talking to users, getting their data, and iterating to find the best fit.

"If my relationship is good he is never gonna leave me, no matter how messed up things get."

Provider of Marketing & Design Services for Restaurants

"I think my number one worry would essentially be around just finding out the next set of people who believe the most in the dream. "

CEO and Founder, content platform startup

When asked about their key day-to-day challenges, one consistent theme emerged. A lack of time to get everything done. This could be because they were dealing with day-to-day issues and the founder inevitably gets the problems which no one else can solve. This lack of time was a serious pressure and many entrepreneurs kept looking for ways to automate tasks to save time. This was made more problematic with the 'funding gaps' experienced by the entrepreneurs. For startup entrepreneurs, finding the right investors consumed a lot of their time. For the agency based businesses, the tasks of servicing existing clients and finding new clients were different. Hence, when they were servicing clients, they could not find new ones, and hence after a busy period, they would face a gap in their cash flow.

"Biggest motivation for me is to keep in mind the grand vision and keep working towards that."

Founder, early stage startup focused on circular economy

Some entrepreneurs faced challenges with organizing information. When they were a small team, it was easier for everyone to be on the same page. But as they grew, it was harder to manage files and create understanding at the same level. Early stage startup entrepreneurs had another significant challenge of going forward with their vision in spite of people not believing in them. Since they face uncertainty, they get advice on what they should or should not do, and sometimes people challenge their vision. They have to persevere in the light of these challenges.

Next, I wanted to understand how do entrepreneurs deal with a challenging world with a lot of information, and how do they make decisions when facing uncertainty. One strong theme to emerge was the reliance on data, as opposed to gut feelings. In the cases where data was available, they would go with data. However, they did use their gut feelings and intuition in case of making key relationships. For example, when they were looking at hiring contractors or freelancers, they wanted to feel that they made the right connections. Similarly, in some cases, the entrepreneurs used their intuition to think whether a client relationship was worth having for the long term. For many service based businesses, long-term customer relationships were much more crucial than shorter term relationships, and hence the importance of gut feelings was enhanced. However, this may also be because there are no well-known avenues to capture data which could predict relationships.

"If there is data against it, that disqualifies the gut feeling."

Head of Operations, Education Tech Startup

Another way to deal with uncertainty was for the entrepreneurs to constantly gather information from their environment. They used blogs, newsletters, social media channels, to gather a lot of information at the 'top end of the funnel'. Some of them wrote blogs to offer more value to their clients and thus kept on top of what was happening in their field.

Also, I wanted to know how do entrepreneurs articulate their big visions. It was interesting to see how the visions varied according to individuals. Some of the entrepreneurs had a vision of connecting people, some wanted to be the best in their chosen area of business. It was also seen that technology startups have different information needs than agency based businesses, this is because the former face much higher uncertainty in terms of a proven product-market fit.

Finally, one more thing came up during some of the interviews which was not planned. Some entrepreneurs (users of Exact software) talked about the lack in current Exact software package. One startup entrepreneur mentioned that the current software does not let them see the runway and cash flow in an intuitive way. Runway is a term which is unique to startups and equals the amount of months a startup can run with the given amount of funds in the bank. This is probably because the current tools are not specifically designed for startup businesses, which sometimes have unique business metrics. Another entrepreneur said that the current software does not include the wages in the costs on a monthly basis.

These insights helped in articulating the following context factors:

- People like to receive information in real-time.
- Entrepreneurs face painful periods of financial 'gaps'
- Entrepreneurs value freedom more than financial safety
- Entrepreneurs want to create a personal impact on the world
- Entrepreneurs tend to start companies with people they already know
- Technology Startups have different information needs than other companies
- Startup entrepreneurs are obsessed about building their team
- Good entrepreneurs are always thinking about how to grow their business
- People want to pursue personal growth, exploration, and learning
- People are realizing the value of data-driven decision making
- People like to deal with people they know and trust
- People define themselves by the work they do
- Entrepreneurs feel they never have enough time for strategic work
- Agency businesses face challenge of balancing the needs of clients and team
- Entrepreneurs' areas of concern change as the company evolves
- People's cultural background influences their business priorities
- Startup entrepreneurs are idealists - they believe in improbable futures
- Technology Startups have different information needs than other companies
- People want to feel freedom and control in their life
- Entrepreneurs trust their gut for making decisions about relationships
- Business opportunities can come from areas which the entrepreneur cannot even think about

4.2 Understanding the attitude of Entrepreneurs' towards Accounting and Accountants

The next set of interview questions was about how Entrepreneurs relate to accountants and accounting.

Various interesting words were used when they were asked to summarize their relationship using keywords. These are shown in the **Figure 16**.

Most words showed that the relationship was routine and repetitive. Entrepreneurs meet their accountant in-person

Figure 16. Keywords which entrepreneurs use for relationship

every quarter to see how their work is going. They use digital tools like e-mail and whatsapp to communicate on regular things, and many use Dropbox to share files. However, some entrepreneurs also trust their accountants completely and enjoy a good relationship. There were cases where these routines was broken. It was noticed that the entrepreneur's contact with accountant intensified when the former was faced with some unforeseen event. For example, in case of the death of a family member, or more commonly, in case of a change in laws and regulations. In these periods, entrepreneurs worked more closely with accountants in order to prevent mistakes in book-keeping.

It was interesting to know that most of the times entrepreneurs found their accountants through references and personal recommendations. They did not take too much time or energy to find out the best accountant. This was especially interesting when contrasted with the attention given to their team. While entrepreneurs take a lot of care for their employees and are very careful while hiring them, they do not seem to take the same amount of care in hiring their accountants. In one case, an entrepreneur even went with the accountant servicing other companies in the same office space.

This was probably due to their attitude towards accounting itself. They did not want to be bothered with accounting tasks which were not their core concern. In most of the companies there was one co-founder who looked more at the accounts and the other one focused more on the core business. Sometimes the latter would not even know which accounting software was used. In general, entrepreneurs found the accounting language very hard to read and thus tended to avoid it.

"It's not fun. Definitely not."

Founder, early stage startup focused on circular economy, on Accounting.

At the same time, accounting was stressful. Entrepreneurs were worried about getting in trouble with the government. They were also anxious when deadline approached and critical tasks had to be done. This resulted in them relying on their accountants almost blindly.

".. all that stuff I don't look after and they tell me this money to this person and I am very slavish and just start putting it into bank account."

Founder, marketing services agency

When asked about how does the accountant add value to them, most entrepreneurs were not clear about how much value the accountant added. They had a vague idea that the accountant was adding value, but how much value exactly, was not clear to them. At the same time, they thought the accountant had ways to add more value and wanted the accountants to be more proactive. They were willing to pay more for such advice and value.

"I don't mind paying money as long as it benefits us both."

Founder, early stage startup focused on circular economy

However, some entrepreneurs had insightful stories when asked about a story of how the accountant added significant value to them in ways they had not foreseen. For example, in case of one entrepreneur, he had multiple business holdings and he suffered a serious loss in one of those holdings. With the help of the accountant, he was able to assign that loss to another one of his holdings. This saved him a significant amount of money in taxes. Similarly, for another, the accountant had valuable advice in terms of allocating new funds in a proper way - which helped them greatly.

These interviews helped in articulating the following context factors:

- Most SMEs and Startups have one specific co-founder taking care of the accounts, other focusing on sales or product
- Entrepreneurs are anxious about Accounting Laws because they want to avoid trouble with government
- Entrepreneurs trust their accountants 'slavishly'
- Entrepreneurs do not spend much energy and time in finding the right accountant
- Entrepreneurs don't know how much value the accountant adds to them
- Entrepreneurs want accountants to add value through proactive advice
- Tax and legal language is not 'human readable'
- Entrepreneurs approach accounting with a mixture of boredom, fear and delight
- People are willing to pay for something when they know it has clear value for them
- Accountant involvement increases in case of 'unforeseen events' for entrepreneurs
- Current common digital tools lack the 'personal touch' of phone calls or face-to-face meetings
- Time pressure and deadlines create stress for entrepreneurs
- Some entrepreneurs see Accountant as a 'sparring partner'

4.3 Understanding Accountants

In the case of accountants, I tried to understand how do accountants add value to their clients - both in general and in specific cases. This might open up possible ways to add the same value through Exact's software.

"We don't look at our 9 to 5 job. We also work in evenings and weekends. Clients appreciate that."

Accountant from Amsterdam

The accountants stressed that they were approachable and available at all times to the entrepreneurs. This was also validated from the entrepreneur interviews where they mentioned that sometimes entrepreneurs reached out to their accountant at off-work hours like evenings and weekends but the accountants were always available. Some accountants mentioned that they were very practical, and some of them pointed out that they offered a very good price to quality ratio. However, the accessibility part was most strong, as almost all of them had clients in areas which were geographically close to them.

When asked for more concrete ways in which they added value, the accountants shared the following insights.

- **Accountants helped entrepreneurs in interpreting the numbers.** Many times the entrepreneurs did not understand what the numbers implied. For example, if their bank account balance was not growing, they interpreted that their business was not doing well, but many times this was not the case because payment cycles might not reflect readily in bank accounts.
- **Accountants gave advice to grow the business.** In some cases, they helped the entrepreneurs by advising them on which tools to use to grow their business. They could also look at the numbers to see if there were some potential threats for their clients' businesses.
- **Accountants were able to provide business specific advice.** With their experience in a variety of businesses, the accountants could find the right business-specific expert to help out their customers.
- **Accountants spent time in educating the entrepreneurs.** Since most entrepreneurs starting the business did not understand accounting details, accountants spent time with them to teach them the basics of accounting language.
- **Accountants connected some entrepreneurs to other entrepreneurs who needed them.** Accountants could offer a network of entrepreneurs, and sometimes could match them according to their needs. For example, one accounting firm matched one of their clients who needed a financial loan to another one who was in the business of providing loans. This was helpful for both the parties involved, resulting in a win-win situation for both the entrepreneurs.
- **They kept up with the changes in law and regulations.** They mentioned that taxes were a key area where they added value to the entrepreneurs and the tax laws kept changing. They added value to entrepreneurs by keeping up with these new regulations.

"There are a lot of colleagues who are still educating because this job is evolving every year again and again."

Accountant from Uithoorn

When asked about their relationship with the entrepreneurs, they mentioned friendliness and a personal touch, though it also varied from person to person. In some cases, the relationship could also be characterised as intense. This is in clear contrast with the way entrepreneurs describe the relationship. We saw that they see it as a more routine and mysterious thing (with blind trust), while for the accountants the relationship is more

of a partnership. However, the accountants had to deal with a variety of entrepreneurs and the relationship varies from one entrepreneur to another. These keywords are shown in **Figure 17**.

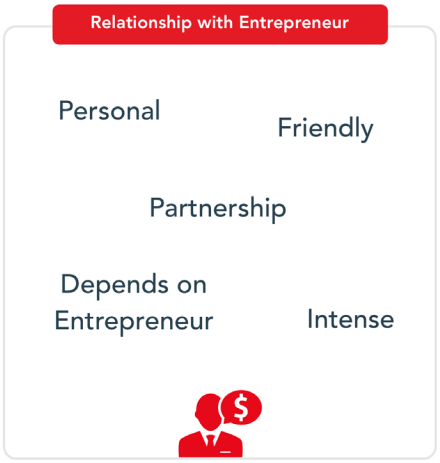


Figure 17. Keywords which accountants use for relationship

Regarding communication, it stood out quite starkly that the accountants preferred to meet in person and wanted face to face contact. Next best priority was phone calls, and they actively disliked digital tools for communication. The key reason was that new things came up in face to face communication, which would be lost with digital tools. Face to face communication was important because:

- It opened up avenues for unplanned questions and conversations
- It helped the accountant to understand what was meant, though not said explicitly by the entrepreneur
- It helped in clarifying communication when they wanted to look at the same thing - for example, if an entrepreneur had some data on an old accounting software, it was hard to see how the same data could be seen on the new accounting software

"...about advice, I want to see him .. during the conversation, you speak about things which you were not planning in for-ward."

Accountant from Uithoorn

"When you meet face to face, things come up which would not, just with an e-mail."

Accountant from Amsterdam

"Robots cannot understand what the entrepreneur really wants. It depends on us."

Accountant from Amsterdam

"We embrace technologies. Maybe in the future we can have one of our secretaries with Artificial Intelligence. That would be nice."

Accountant from Uithoorn

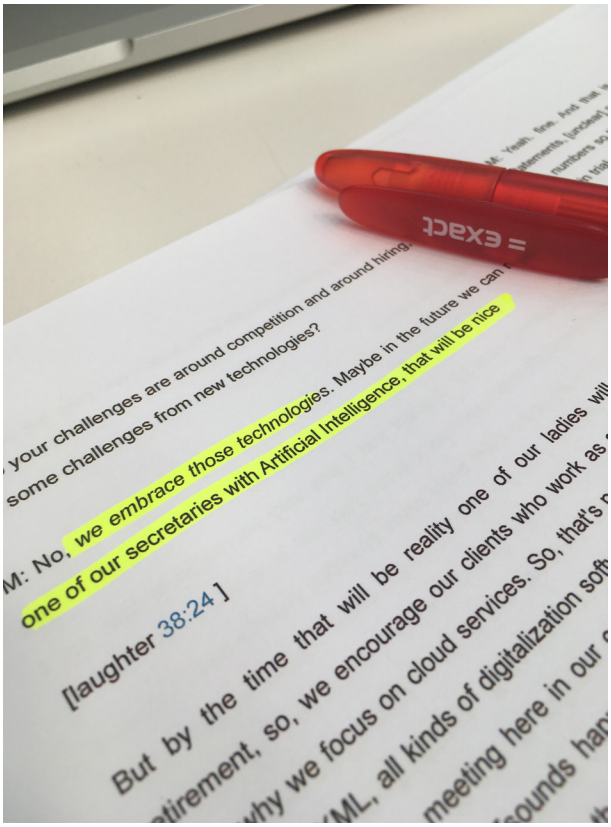
"The IT does a lot for you... Technology is helping us... I like to try tools out."

Accountant from Amsterdam

It might also be the case that they prefer to have clients in the same geographic location because that gives them more opportunity for face to face contact.

When asked about challenges to their business, most of them mentioned competition, and to some extent, lack of talent in the market. Interestingly, none of them saw technology as a threat and most were willing to embrace it. This was striking because within Exact, many people think that with increasing automation, the jobs of accountants might be at risk. But the accountants themselves do not see it that way. According to them, technology only helps them focus more on the advisory tasks while taking away the more manual tasks. Accountants were confident that they could provide value because of the things they could do which a robot could not.

Some of the accountants underlined how new technologies were helping them doing their jobs better and become more productive. However, they were not necessarily trying to be first with new technologies. Some of them preferred to see other firms apply the new technology and be certain that it works. And once they were sure, they would implement the new technology.



These interviews helped in articulating the following context factors:

- Accountants prefer to have face to face interactions with their clients
- Accountant's experience helps to interpret their clients' unspoken needs
- Accountant involvement increases in case of 'unforeseen events' for entrepreneurs
- Accountants are flexible to 'real-time' demands of entrepreneurs
- Accountants worry about their advice not being listened to, hence they prefer phone or in-person meetings
- Accountants prefer their clients to be geographically close
- Accountants deeply care about Entrepreneurs
- Accountants are always looking for new opportunities for their clients
- Accountants wear many hats - coach, sparring partner, compliance checker
- Different business structures have different growth priorities
- Accounting takes more than 7 years of professional training - academic and practical
- Entrepreneurs and Accountant seek a 'click' with each other
- Different business structures have different growth priorities
- Face to Face contact is a rich source of information
- Accountant's tax expertise is a good source for finding opportunities to save money
- There is a clear shortage of qualified accountants in the Dutch market
- High quality work on basic accounting tasks forms foundation for valuable accounting advice
- Some accounting firms wait for others to experiment with new technology to avoid mistakes
- Future entrepreneurs will be more demanding of accountants' time
- Accountant adapts to information needs of entrepreneurs
- Accountants need to remain updated with latest laws and regulations
- Accountants want to be accessible and are flexible with client demands

4.4 Findings from Expert Interviews

In this section I will give a brief outline of the interviews with the experts and what were the key findings. This section will help in understanding the generation of context factors from expert interviews. The interviews will be summarized one by one because each expert was from a different field and brought quite unique insights.

Expert 1: Understanding Society, Regulations and Technology in the light of P2P networks enabled by Blockchain

Expert 1 is an Asst. Professor in Institutional aspects of Information and Communication Technology (ICT) at TU Delft. She has three key research areas:

1. Institutional aspects of ICT: This area talks about the interactions between society and technology with focus on regulations and policy.
2. Sharing economy: ICT enables coordination between individuals and gives rise to peer-to-peer (P2P) networks. She researches how do these bottom-up initiatives evolve over time and what needs do they serve.
3. Design principles for self-organizing systems: Which principles are relevant to developing communities for sharing knowledge and resources.

The questions to her were about trends in ICT, the broad macro-economic and social forces giving rise and shape to technologies, and design of successful bottom-up platforms.

According to her, IoT (Internet of Things), AI (Artificial Intelligence) and Blockchain were general purpose technologies, and such kind of technologies affect governments, businesses and citizens. She mentioned that especially blockchain has

a high potential for impact because it removes the need for Trusted Third Parties (TTP) - which is the role played by the government. Thus, in this way, this technology competes with the government itself. However, government institutions are still needed to 'keep an eye on the process.'

Her key insight was that with every kind of change in technology, people develop a set of checks and balances to deal with them. This is because the society needs to protect the weaker among them, and hence develop processes which are right and fair. She classified the checks and balances in three categories of mechanisms:

- **Technical Mechanisms:** She said that the government could mandate specific technology requirements. For example, they may ask a webshop to adhere to specific technical standards.
- **Institutional Mechanisms:** Governments might ask some businesses to be certified to make sure they meet certain quality standards.
- **Social Mechanisms:** In some cases people themselves develop mechanisms in their communities to safeguard against potential harms from new technology applications. For example, people may organize on social media platforms to complain about a specific product or service. She mentioned the Dutch platform 'tweakers.net' as a concrete example of such a platform.

It was also discussed how different countries and established cultures lead to success of new technology based businesses. Countries which have solid institutions face lesser threat from new P2P (peer-to-peer) technologies - which let people connect to each other directly without any third parties. She offered a contrast between the Netherlands and Brazil. Because the Dutch banking institutions are strong, there is less need for P2P lending. Whereas in Brazil, since the banking sector does not take care of people's financial needs, P2P lending businesses come into play.

She mentioned that many big companies are experimenting with the blockchain technology and some, like IBM are even exploring the Blockchain-as-a-Service (BaaS) as a business concept. However, she believed that it will take 6 to 8 years for blockchain applications to become mainstream, if they do. She personally had a mistrust of the technology because we do not know if it has a back-door - a way to compromise its security.

We also discussed how the current technology companies could come under threat from Blockchain technology in the future. Companies like Uber and AirBnb, though much celebrated, act as a middleman between let's say drivers and passengers. A P2P platform which would let them connect directly would make these companies obsolete.

Overall, it was an insightful discussion from a macro perspective, and it contributed in articulating the following context factors:

"What if you have a Blockchain application for taxi drivers? It's just you and the driver."

Expert 1

- New technological innovations create the need for having new laws and regulations
- To adapt to new technology, society evolves a system of checks and balances
- Governments want to be technology neutral and encourage innovation, but also to preserve public values
- People will have multiple streams of income aided by multiple currencies

Expert 2: Tenured Researcher on Computer Vision. PhD from University of Genoa in Italy, now working with Exact as Senior Data Scientist

Expert 2 has expertise in understanding quality of multimedia experiences. This is a multidisciplinary field which connects visual perception, cognitive science and engineering, machine learning and computer vision. Her insights were valuable in understanding the applications of Machine Learning (ML) with an added focus on Exact.

"Applications - pretty much everything, to be honest... anything which has been used for forecasting is using machine learning."

Expert 2

She explained that ML was not very different from other types of statistical modeling in principle. You have some input and output variables, and the model predicts the output from the input variable. However, in regular statistical modeling, as the size of the data set becomes larger and larger, the accuracy of the model tends to get reduced. Hence to deal with complex set of variables and large datasets, machine learning is used. ML is about making better predictions by building more complex models with your data.

Given its general purpose, she said that this technology can

be applied everywhere. Anytime there is a prediction needed, we can use machine learning. It is being used in Human Resources (HR) for evaluation of candidates, from performance to retention, it is being used to analyze video and images, it is being used in the logistics sector to save fuel costs by trucks. She also mentioned that the volume of images and videos in media is growing exponentially and hence these are good candidates for applying machine learning.

She also shared some insights about the User Experience (UX) of videos. The UX depends on the context in which the video is consumed. The behavior varies according to the user's personality and interests too. Once the data on these variables is collected, it could be used to provide better UX to the user. In some cases they found that even bad quality videos performed better because it was content the viewers cared about.

When discussing the future she said that the IoT will evolve to IoE (Internet of Everything) - when we have human beings as sensors. We are starting to capture physiological data with devices like the fitbit. These devices could monitor emotions and there could be applications which could recommend content based on the user's emotional state. She stressed that data about human emotions will be very important in the future. However, for now we faced many challenges in this area. To quantify emotions and personality, we need to clearly define what these terms actually mean.

"IoT will become IoE... humans as sensors... data on emotions is the big thing of the future."

Expert 2

Another example of application offered was around 'prescriptive technology'. Here, the system could take decisions on the user's behalf instead of giving the user a choice. For example, when a hairdresser's shampoo stock would go below a certain level, the algorithm could directly order it from the store.

When asked about the challenges facing machine learning, she mentioned a few practical impediments:

- **Using the wrong models:** She mentioned that in most cases people try to use complex models when simple one work well enough, this needs to be changed.
- **People are not ready:** She mentioned that people were not ready enough for some of the more advanced applications of ML, but with passing time, they will be more open to adapting this technology.
- **Explainable models**: More advanced models are harder to explain. This can create biases. With time, we should see more complex models which are also more explainable.
- **Multi-disciplinary teams**: With more complex problems, domain experts are needed to ask the right questions. At the same time people who can be a bridge between different domains are needed. There will be more and more need for such people.

"To ask the right questions you need domain knowledge. By myself I can't answer rocket science problems."

Expert 2

She also mentioned the following possible future applications of machine learning:

- **Better analysis of vision**. This has already been achieved but had computational bottlenecks. With the cost of computing reducing, this will become easier. For example, making summaries of videos.
- **Better recommendations with data about the user's context.** The context would include the user's personality and emotions
- **Creating whole new products directly by analysing the user's data.** This could mean skipping the Marketing function altogether.
- **Generating content based on user information**. For examples, movies or songs made for just one person. This might sound implausible, but the components are already there.

Finally for Exact, the following avenues were mentioned:

- Most SMEs are not data-savvy. Exact can help them by leveraging the power of data.
- Exact could use prescriptive technology to help SMEs in their business. As mentioned, it could order the supplies for an SMEs itself based on the data-based analysis of their needs.
- Exact could generate recommendations for their supplies as well as suppliers.

In conclusion, this was a very exhaustive and insightful, covering a broad range of topics around machine learning and its applications. While many applications seem almost magical, Expert 2 suggested that they were possible and in many cases, already in works at companies like Facebook, Google and Mozilla. This interview contributed in articulating the following context factors:

- Data is exploding on all fronts
- Converting experience and emotions into data can provide opportunities to improve them

- More data about the customer can be used for designing a better user experience
- Human intelligence and experience is needed to ask the right questions to address problems
- Machines are becoming increasingly better at making predictions in all walks of life by understanding hidden patterns in data
- Machines can detect emotions and personality from text typed by a person
- Technology becomes cheaper in the long term
- People with different personalities, backgrounds, and values find it difficult to communicate productively
- Our emotions are a rich source of information about our preferences and attitudes
- Every business domain has its own valuable specialized knowledge understood by experts

Expert 3: Vice President at a Venture Capital (VC) firm, with experience in Private Equity (PE) and Quantitative Finance

As a part of the Venture Capital industry, he is responsible for identifying companies worth investing in. VCs work on a long time horizon of returns and hence need to keep a keen eye on future trends. He has also worked in Private Equity and is a former entrepreneur himself, with companies in quantitative finance.

This was a shorter interview due to his time constraints but very insightful nonetheless. He mentioned three big technologies with reference to the business of accounting - Blockchain, Machine Learning, and Voice Input.

"Big companies can get away with sh**er applications because they own the data."**

Expert 3

He said that the blockchain was important because it removes the control of data from companies. Today, a lot of companies can survive even with not so great products because they control the customer data. This is ultimately inefficient for the end consumer. The blockchain can enable the unbundling of data, algorithms and applications. This is because the blockchain makes the data public, verifiable and decentralized.

And if the data is freely accessible through the blockchain, then application developers will be able to create applications based on it, thus creating more innovative products. For example, for now the Facebook application both owns the algorithms it applies to the user's data as well as the data itself. In the future, there could be different companies providing

"I could say, send 5 Euros to Martijn as a payment for the coffee."
[paraphrased]

Expert 3

the algorithms and the applications, and the user could own his or her data and control it according to his or her wishes.

Further he mentioned how voice input could help accounting. Currently, data entry is hard because someone has to fill in the data in an Excel sheet by typing. With advances in voice technology, the accounting ledger could effectively be spoken,

"Chatbots... came and died. I asked myself, is there a problem which can be solved by a chatbot? If I am not excited, I will not invest."

Expert 3

and this would lead to a better input process and hence also better performance at the back-end. He also offered some examples to illustrate his point.
Finally he also offered some insights into how VCs make investments in technology. It is not about the technology itself, but about the problem the given technology can solve. He gave the example of chatbots here, where while it had been a popular technology, but it was not solving any critical problem, and hence his firm was not excited about it.

Overall, this interview was valuable in understanding how the blockchain could create value as well as finding some concrete examples for voice based user interfaces. This interview helped in articulating the following context factors:

- It is more natural to speak out commands rather than typing them out
- Voice interfaces can provide much more flexibility than screens for some use cases
- Economic value is created by bundling and unbundling services and products

Expert 4: Data Scientist at a German Retail firm with a PhD from EPFL, Switzerland.

He did his PhD in the application of Machine Learning to filter voice from a crowd's noises. His insights were helpful in understanding the potential as well as the limits of NLP, as well as a broad understanding of Deep Learning, which is a more specialized branch on Machine Learning.

He started with mentioning that machine learning is useful because data contains 'hidden properties'. Companies can get the data in a lot of ways - from their websites or from their sales figures, and data mining is the process of giving this data a structure. The hidden properties of these data can be brought to light by applying machine learning techniques to this structured data.

After this he mentioned that Deep Learning is the latest trend in machine learning. While most machine learning uses structured data, deep learning is powerful because it can learn on unstructured data - which is data taken directly from the world without filtering. However, deep learning is also more complex and expensive and a lot of useful tasks can be done without it.

He defined NLP as the application of machine learning on audio data to understand it's meaning. It is an extremely hard problem because finding the meaning of what is said is different from literal translation. The translation of meaning versus literal translation is the core challenge of NLP. At the same time, real-time translation is another challenge. This is because the meaning of a sentence is not apparent when you start speaking, it becomes apparent only when the sentence is finished. Some tools like Skype are trying to perform this task but the performance is not good enough. Given the complexity of the problem, he asserted that perfect NLP is not possible in the near future. A longer time horizon of the range of 30 years could produce a lot more.

"Language is complex because humans are complex. It has sarcasm, emotion, meaning."

"NLP is far away."

Expert 4

This interview helped in articulating the following context factors:

- Human language is rich and complex with emotion, sarcasm, and context.
- Data contains 'hidden properties' which can be brought out by predictive analysis

Expert 5: Machine Learning PhD Candidate at TU Delft, working with Exact as Senior Research Engineer

His insights were helpful in understanding the broad applications of Machine Learning as well as ideas on specifically applying these methods to Exact's products.
He mentioned some key applications of machine learning:

- **Recommendation systems:** In recommendation systems, people get recommendations to people based on their data. For example, Amazon shows 'recommended products' based on shopping data.
- **NLP**: He mentioned that while NLP is making progress, it still has a long way to go. This is because we need to understand the context, and it is not enough to just literally cut the sentences to see what they mean. The lack of clear rules for language makes NLP much harder.
- **Image recognition:** Recognizing faces and other objects from images was another application. Platforms like Facebook use these algorithms to identify people in images.
- **Accounting**: For Exact, machine learning could be used to assign transactions to Ledger accounts automatically. Similarly, algorithms could predict when a the supplies of a business may go out of stock.

For further growth, he saw no impediments. He mentioned that with more growth in data and computational power, these algorithms should give better results. His points helped in underscoring the difficulty of NLP and the importance of recommender systems. This was helpful in articulating the following context factors:

- Machines are getting better at understanding unstructured data from the real world
- Larger samples of data are less prone to variation and error
- Machines can detect emotions from photographs of people's faces
- People with similar identities prefer similar content and products
- Machines are getting better at recognizing human faces accurately

Expert 6: Global Product Manager at Intuit, the American Accounting Market leader

She was helpful in understanding the inner workings of a competing accounting firm, which has a rich history of innovation and subsequent market dominance. She suggested innovative processes and ideas for product development which can be useful for Exact. It was interesting to see how product managers approach the development process in other firms.

One key insight was about the product tenets at Intuit. She said that every product had a set of implicit tenets which were adhered to over the years. For example, one tenet is that everything in the product is reversible. Whatever the user can do, can be undone. Similarly, there are other tenets which make sure that the product maintains its core even while its UX or engineering change or evolve over the years.
She also emphasized the customer focus at Intuit. She said that professionals from all disciplines - Product Managers, Architects, Designers, and Marketers - were very close to the customer. These are done through specific practices like:

- **Follow me home**: In this practice, the users are observed directly at their workplace by shadowing them. It is important to shadow users because they may not be able to tell what they really want and why. The answers to these questions can be decoded by observing them directly in their context.
- **User Recruiting Team:** There is a team dedicated to recruiting the users. A product manager can ask them to get in touch with a specific persona, and the team sets up an appointment with a user which matches that persona. This helps the product manager to go about solving problems in a more focused way.
- **Design for Delight:** This is a tool where the product managers can get the users to test multiple prototypes and test them. They can test up to 5 prototypes in one hour. This speed helps them in getting the design exactly right according to the user.

"If you name any feature of the product right now, I will think of 5 customers who I have either talked to, or who have expressed problem with it, or who I have read about, or who I have e-mailed things about."

Expert 6

These ideas can also be implemented at Exact to get better outcomes. Especially having a ready way to access customers would be very helpful for research.

She also mentioned some current industry trends:

- Revenues from their desktop product are growing - this is maybe people still want to control their data.
- In the future, the data entry part of accounting and book-keeping might not exist the way it does now.
- Xero is seen as the key competitor of Intuit.
- In the last 10 years, there has been a growth in self-employed people and freelancers, and Intuit is focusing on them as well.

This interview helped in articulating the following context factors:

- The number of companies in the world is growing
- People are not good at telling exactly 'why' they like or dislike something
- Small mistakes with feedback help in making right decisions
- In a rapidly changing world, speed of execution becomes critical factor of success

Expert 7: Divisional Director of Technology at Exact Software Headquarters in Delft

He has been working at Exact since the last 21 years. He was able to chalk out how Exact has evolved over the last 30 years with its challenges in technology, and provide insights about the future strategic markets. He was also able to clarify how Exact was different from other platform businesses - it was more long term relationship based versus transaction based business.

He mentioned that moving to the cloud business was very useful for Exact because having a cloud based solution helps in establishing a 'single source of truth' for accounting. Cloud also enabled the connection to 3rd party applications through the app shop of Exact, which is similar to the App Store by Apple, but with the apps developed for products of Exact.

He mentioned that in the future, the biggest shift will be that the banks will open up their data and things will become more in real-time. Entrepreneurs will be able to see changes to their data in real-time. He mentioned that accountants will experience downward pressures in revenue because manual entry is a significant portion of accounting business today, and with time, manual entry will be automated.

When asked about what kind of startups could threaten Exact's business, he mentioned that a new startup will have something which will be very valuable to the accountant, as they are key influencers in decision making about the software. The entrepreneurs trust accountants to suggest them the best software. However, it was hard to change the

"If you want quality advice, you still want to sit together, have a cup of coffee, talk about the business."

Expert 7

existing accountants' habits.

When asked about how Exact could work as a platform business, like Uber and AirBnB, he shared that these are transactional businesses, while accounting is still based on relationships. In case of Uber, you meet the driver only once and for a short period of time, but you meet your accountant regularly, for long periods of time. This makes the relationship more important. This reinforced the insights from the interviews with accountants.

This interview helped in articulating the following context factors:

- Data is exploding on all fronts.
- Entrepreneurs and Accountant seek a 'click' with each other
- People like to receive information in real-time
- Accountants prefer to have face to face interactions with their clients
- Number of small sized companies (less employees) is rising
- People find it painful to change their habit patterns

4.5 Other findings and context factors

Apart from the interviews, books (mentioned in Appendix A8) and research papers were looked at for more context factors, especially on machines, business models and cognitive science. Apart from these, based on personal experiences and opinions, I articulated my own context factors. This section outlines these context factors and the reasoning behind them. While all of these are rooted in real-world phenomena, there is still a designer's interpretation involved. Also, some of these may not be directly related to the final concept, but these were found interesting when the designer was searching for relevant factors.

These are grouped into the following broad categories for easy comprehension. This categorization is only for understanding the source of these factors. The new meanings created by these factors are detailed in the next section.

Rising Popularity of The Blockchain

Learning about the blockchain led to the following context factors:

- Trust is an extremely valuable commodity
- People do not like intermediaries, middlemen, or third-parties
- People value transparency in their transactions
- People like to speculate about the future

These factors were important because the blockchain lets people have a trusted and secure decentralized source of data. As mentioned by Yli-Huumo, et al. (2016), interest in Blockchain technology has been increasing since 2008. This implies that the possibilities provided by this technology fulfil deep human needs. At the same time, Kelley (2016) underscores the importance of 'Trust' in the world of the future. He asserts that since everything digital can be copied, the importance of authentic, trusted product increases. Trust is an intangible which cannot be copied. Thus with the growing amount of digital data, importance of trust will only increase.

Finally, this year 2017 has also seen a lot of interest in Bitcoin where it has reached all-time high value. I believe at least some of that interest is a result of pure speculation (apart from other benefits). This can also be related to the well known Tulip Mania speculation in the Netherlands in 1600s. This type of activity led to the context factor that 'People like to speculate about the future'.

Insights from Cognitive Science

Most of the factors about human cognitive psychology were adopted from Kahneman (2011), and some from Brynjolfsson and McAfee (2017). I mention and discuss them briefly below.

- In a complex world, we aggressively filter information using heuristics
- Information overload leads to poor decision making
- People make errors of judgement from finding stories in sparse data
- Seeing multiple options for a decision makes logic dominate intuition
- Bizarre, funny and visually striking things capture human attention
- Good mood makes people more creative, and less careful
- Interpretations of an event affect our emotions and experience about the event
- People assign much greater importance to the first number they see in any context
- We like products which are both typical of a category and novel

These factors mostly deal with how human beings deal with

information in their day to day tasks. We are overloaded with a lot of information in our environment, and to make decisions, we need to make sense of this information. But due to our biases, we end up making a lot of sub-optimal decisions.

One way we make decisions is using heuristics; also called mental shortcuts or rules-of-thumb. For example, we might think that there are a lot of plane accidents but fewer road accidents because the former dominate our minds more. Similarly, racism or stereotyping may arise due to having certain opinions about certain types of people. While these heuristics lead us to errors many times, we cannot work without these, as we need these to make sense of the world. They are controlled by the System 1 (Kahneman 2011), that is, automatic processes of the human mind.

This also relates to the human need for finding stories in data, even when the data quantity and quality are not enough. For example, listening to few songs of, let us say Cuban music and not liking them may lead the listener to believe that all Cuban music is not to his or her taste. However it is more likely that he or she will revise this opinion if exposed to a larger set, say around 30 songs. Apart from quantity, human beings also do not take the effort to check the quality of the data and readily believe data without questioning it or checking the sources. This can be seen in the dominance of the phenomenon of 'fake news' in today's political environment.

Kahneman (2011) tells us that one way to fight intuitive, biased decisions is to see multiple options for every decision. This engages System 2, which is the rational part of our mind, over System 1, and thus helps us in making better decisions. It might be possible for entrepreneurs to make better decisions if they look at multiple options for every key decision.

The human need for stories, as well as the impact of stories can also be seen by the fact that our interpretations of an event can affect our emotions and experience about the event. For example, people who see a failure as a way to grow may actually embrace the learning and hence grow further, while seeing it only as a failure may lead to a feeling of dejection. To be able to persevere in the face of difficult odds, good entrepreneurs need to interpret harsh setbacks in a positive way.

Another one of the findings is about mood. Good mood is necessary for optimism, which increases risk-taking. It also makes people more creative (Kahneman, 2011). Most entrepreneurs are optimistic risk takers, and this helps in powering a capitalist economy. However, a good mood also reduces vigilance and makes the System 1 dominate, leading to poorer decisions out of overconfidence. It was interesting to see the contrast in the entrepreneur and accountant personalities in this regard. While entrepreneurs need to take risks, accountants are vigilant and need to prevent mistakes. This might also be the reason why accounting is seen as a 'boring' job by some people.

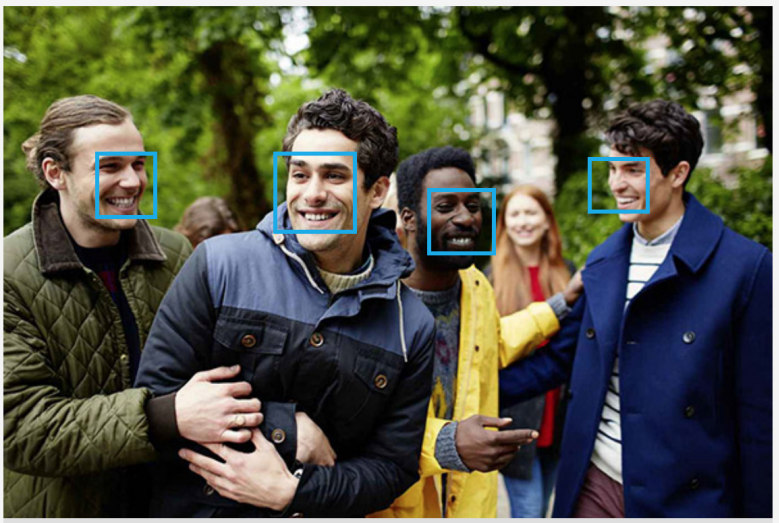
Another interesting factor was the effect of first number seen by people in any context. This is called the 'anchoring effect' (Kahneman 2011). Anchoring is said to occur when human beings use the first piece of information they get to make later judgments. For example, the initial price offered for a second-hand product may set the baseline for further negotiation, thus influencing the transaction and resulting in a final price which is higher than what the product is worth. Since entrepreneurs make a lot of financial decisions through purchasing and negotiations, this effect might play a significant role in their daily life.

Finally, the design aesthetic principle of MAYA (Most Advanced, Yet Acceptable) was taken from Hekkert (2006). This principle states that people prefer products which are similar to the products they are used to, but still novel and new.

The capabilities of machines and humans and their consequences

These context factors were taken primarily from Brynjolfsson and McAfee (2017), along with some other sources. The objective was to understand the possibilities offered by technologies as well as their limits. This exploration helped in articulating the following context factors:

- People are willing to give away data for convenience which comes from personalization
- Centaurs (Human + AI) create the best combinations for performance
- Machines can read our emotions as we look at screens and adapt content accordingly
- Personal devices are becoming interfaces to the cloud
- A persistent identity is the foundation for trust in the



online world
- People cherish the feeling of being understood
- People like to be 'first to arrive' at key events
- Value of human experience is increasing

Machines are improving at judgements and in understanding speech and faces, and emotions from faces. Microsoft offers a service which can help detect faces in images as well the emotion denoted in each face (and give it a score). A screenshot from their website is shown in **Picture 5**.

Similarly, Google's algorithms are becoming better at detecting what is being said. They are very good at converting speech to text, reaching around 95% accuracy (Glaser, 2017). However, it is important to note that this is speech accuracy and not necessarily accuracy of meaning. That means, the machines are getting better at recognizing what words are being said, but actually understanding the meaning correctly is a much harder problem.

Brynjolfsson and McAfee (2017) underscore that while machines are getting better at human-like tasks, the best performances come from combined teams of humans and machines. For example, they mentioned that the best competitive chess players are not humans or machines, but 'centaurs' - teams where a human being is paired with a machine algorithm - they outperform both only humans and only machine opponents.

Since machine algorithms rely on user data for best performance, it is important that people share their data to make the algorithms better. This data makes it possible for the applications to provide a more personalised and customized experience. This leads us to the factors which state that people are willing to give up private data for the convenience which is provided by customization. More data creates better


```
Detection result:
4 faces detected

JSON:
[
 {
   "faceRectangle": {
     "top": 114,
     "left": 212,
     "width": 65,
     "height": 65
   },
   "scores": {
     "anger": 1.0570484E-08,
     "contempt": 1.52679547E-09,
     "disgust": 1.60232943E-07,
     "fear": 6.00660363E-12,
     "happiness": 0.9999998,
     "neutral": 9.449728E-09,
     "sadness": 1.23025981E-08,
     "surprise": 9.91396E-10
   }
 },
```


Picture 5. Emotion Recognition from faces by Microsoft

performing algorithms, which create better experiences, which incentivize the users to share more data. This becomes a virtuous cycle with the result that people share more and more data about themselves.

However, in a world with a lot of information and data, and falling price of technology, a few things become more valuable. For example, people are willing to pay more to be 'first' at something. This can be seen in the premium prices commanded by hardcover books, which are sold before the paperbacks even if they have the same content. Similarly, the value of direct, human experience is growing. For example, people are paying less for digital music, but they are willing to pay more for concerts (Kelley, 2017). Finally, it is very important to have an 'identity' in the online world, to ensure that others can trust you.

Business Trends of Today and Tomorrow

In the book 'Machine, Platform, Crowd' the authors Brynjolfsson and McAfee explain three broad trends for the future of business: Machine Intelligence, Platform Businesses, and Crowdsourcing (Brynjolfsson & McAfee, 2017). The first one is about how machines are getting better and better in the tasks which were supposed to be done better by humans, that is, tasks which require human judgement, like medical diagnoses. The second one is about how the biggest businesses of today are two sided or multi-sided platforms, and lastly, how companies of today are using the crowds to get more innovative ideas. Throughout the book, a key stress on power of networks is visible. These are some of the key trends taken from this book:

- 'Network effects' dominate the economics of most businesses today
- The world is moving from hierarchies to networks
- Networks create value for both individuals and companies
- People from outside a field can sometimes give better solutions than the experts
- Large scale collaboration enables people to create magnificent, monumental things
- In practice, complete contracts are not possible

About platform businesses, we can see that companies like Facebook, Uber and AirBnB provide platforms for suppliers and buyers (or users). Facebook does not create content, Uber does not own Taxis, and AirBnB does not own real estate or hotels. But these businesses help in connecting the people who need the product or service to someone who can provide them. These companies grow using network effects, which means that the value of the network increases with every new person on the network. These led to the factors about networks being valuable.
Another strong idea is innovative solutions coming from

people which are outside the core of a company. This helps businesses in bringing the best ideas into their companies, no matter where it is located. To harness the power of the crowds, some companies are outsourcing innovation by holding competitions and rewarding the best performer. For example, Brynjolfsson and McAfee (2017) mention how General Electric & University of Louisville launched an online competition in 2015 to discover a design to make a viable nugget ice maker for home - and found a design which worked. Not only did they use the crowd to create the product, they also used it to test the market for it.

This led to the context factor that people from outside a traditional field or company can sometimes provide answers not readily available to the insiders. Also, large scale collaboration of crowds has been able to create things like Wikipedia, the Linux operating system, as well as the Blockchain infrastructure.

At the same time, Brynjolfsson and McAfee (2017) talk about how we cannot rely on the crowd for everything and we still need companies because complete contracts are not possible. That is, it is not possible to design contracts which have each and every future possibility in mind. Hence, we need the conventional management structures to make decisions and it is very likely that the current management structures will persist across the coming years.

Some Personal Context Factors

In this section, I explain some context factors which are personally relevant and arise from my life experiences, observations and opinions.

People like tools which they can adapt according to their wish and needs

I have been using digital tools for a very long time and I always keep trying to shape the tool according to my preferences. Tools like Adobe Illustrator, Evernote and Microsoft Excel provide many ways to shape the tool according to the user, and hence make the user feel in control. In a similar vein, Lego bricks can be used to create multiple beautiful things. In fact, one reason why physical notebooks are still preferred by creative people could be that these are much more flexible than any digital notebook. Hence, I believe that people who love to create new things want their tools to be flexible, so they can customize these according to their idiosyncrasies.

I also believe that tools which people can customize themselves can help them become more productive by making them easier to enter a state of 'flow'.

People like to be a part of fantasy worlds

I enjoy reading and find that the most sold books are those which belong to the fantasy fiction genre. Books like 'The Lord of the Rings' and the Harry Potter series take people into new fantasy worlds which are full of magic and adventure. Similarly, popular TV series like 'Game of Thrones' also take us into fantasy filled stories. Finally, the massive video game industry is built on many fantasy games. All of these are attempts to escape into a more fantastic worlds away from our routine existence.

To some extent, I see entrepreneurship as an attempt to enter such a fantasy world. It is very challenging and adventurous, as well as very rewarding, if one can win over the difficulties.

People like to discover 'hidden gems'

This is similar to people enjoying the unknown. Competitions like 'treasure hunt', as well as having hidden gems and power-ups in games indicate that people enjoy these little surprises.

People like to interact with 'personalities' and not 'dumb' machines

I believe that people do not like to interact with machines which do not have a 'personality'. This occurred to me when looking at online tutorials to design chatbots. These tutorials emphasized that the first step to creating these bots is to define a 'persona' and 'tone' for the bot. This implies that even when talking to a machine, people do not want a neutral voice, but they want to interact with a well-defined personality.

This practice is also similar to brand design where marketers try to define a brand's personality before outlining the product. For example, a brand like Google might be seen as 'playful' while a brand like Harley Davidson might be seen as 'intimidating'. Even when these products are non-human, they are given a personality.

In this section, we saw how context factors from the broader outside world were articulated based on secondary research through literature and online sources. The context factors came from diverse disciplines of business, technology and cognitive science and thus might lead to a more original solution. While all factors have the designer's interpretation involved consciously or subconsciously, some context factors were added solely from the designer's experiences and observations, and these were also outlined.

“No one is as smart as everyone.”

Kevin Kelley
Author, *‘The Inevitable: Understanding the 12 Technological Forces That will Shape Our Future’*

CHAPTER 5

Creating Future Context

Entrepreneurs approach
an **exponential world.**

Chapter 4 laid out the details how data from interviews and literature led to the final context factors, as shown in the image below. After this process, the analysis approach shown in **Section 3.4** was taken to cluster and filter the context factors and articulate the final future vision. In this section, I will outline the details of the future context which resulted from analysing and clustering the context factors. The process is shown in Figure 16.

I first describe each emergent cluster one by one, and then the picture which emerges when combining the clusters. Finally, I will offer the vision statement which will define what contribution I as a designer want to make to this world.

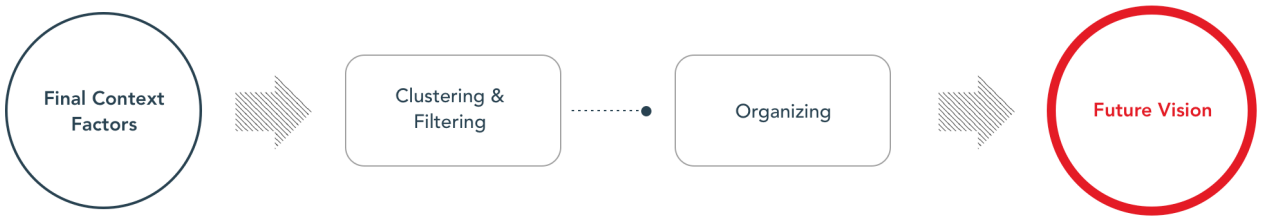


Figure 16. Clustering, filtering and organizing the context factors

5.1 The Clusters Making up the Future Context

An Exponential World

This is the foundation of the future context. This cluster underscores the increasing complexity of the future world. The new world is more abundant with opportunities, and it is also more uncertain and unpredictable. It is a more flat world, where the power resides in networks and hierarchies are weakened. It is a world where knowledge grows exponentially, but ignorance also grows exponentially.

In this world, anyone can start a company. In fact, many people will start multiple companies. The cost of technology will keep dropping, making the ability to create new products within the reach of anyone. This is already happening today with people buying technology off-the-shelf, like server space from Amazon. Later, people will be able to buy advanced services (like Artificial Intelligence algorithms) off-the-shelf, and focus more and more on their core offering. This is visualized in **Figure 17**.

The following context factors create this cluster:

- The number of companies in the world is growing
- The number of small sized companies is rising
- Some entrepreneurs have multiple lines of businesses
- People will have multiple streams of income aided by multiple currencies
- Technology becomes cheaper in the long term
- Business opportunities can come from areas which the entrepreneur cannot even think about
- Networks create value for both individuals and companies
- The world is moving from hierarchies to networks
- Data is exploding on all fronts
- People are getting smarter, faster, and better - that is, more productive.

This cluster links to three sub-clusters. These sub-clusters fulfil a clear function - a need to filter the signal from the noise.

Filter by Regulation - filtering out the harmful

The first filter is the response by society or government to protect against possible harm created by technological innovation. Every society evolves mechanisms to deal with change (Expert 1, Personal Communication, 2017).

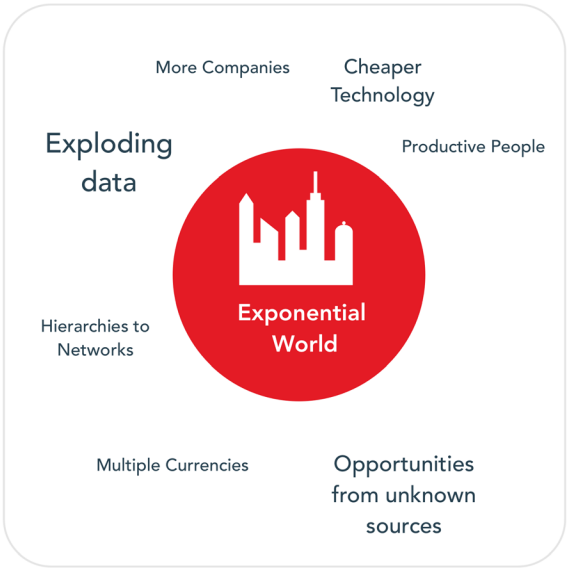


Figure 17. Cluster - the Exponential World

Sometimes the mechanisms can be social or institutional. Sometimes the society creates self-governing controls, and sometimes government institutions step in. But the

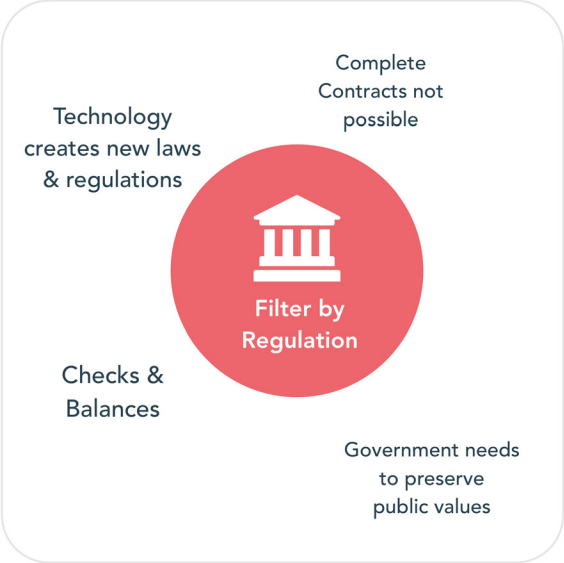


Figure 18. Sub-Cluster - Filter by regulation

overarching theme is the same - to prevent against harm or misuse of the innovations. This is shown in **Figure 18**.

The following factors make up this cluster:

- New technological innovations create the need for having new laws and regulations
- To adapt to new technology, society evolves a system of checks and balances
- Governments want to be technology neutral and encourage innovation, but also to preserve public values
- In practice, complete contracts are not possible

Filter by Expertise - filtering out the irrelevant

In an exponential world, experts play the crucial role of filtering out irrelevant information. While we can search for a lot of information on the internet, we need experts to filter out what is truly useful and relevant in our specific situation. While machines can and do take over simple tasks, experts have to give more energy and time to deal with complex tasks. Also, expertise involves knowing what are the right questions to ask in a given situation - a task which is suited well to human beings. This cluster is shown in **Figure 19**.

The following factors make up this sub-cluster:

- Every business domain has its own valuable specialized knowledge understood by experts
- Human intelligence and experience is needed to ask the right questions to address problems
- High quality work on basic accounting tasks forms foundation for valuable accounting advice

Figure 19. Sub-Cluster - Filter by expertise

- Accounting takes more than 7 years of professional training - academic and practical
- There is a clear shortage of qualified accountants in the Dutch market

Filtering by Algorithms - filtering out the redundant

Most of machine learning algorithms work to filter out the noise by finding useful patterns in a sea of data. A pattern is essentially a distillation of meaning from redundant

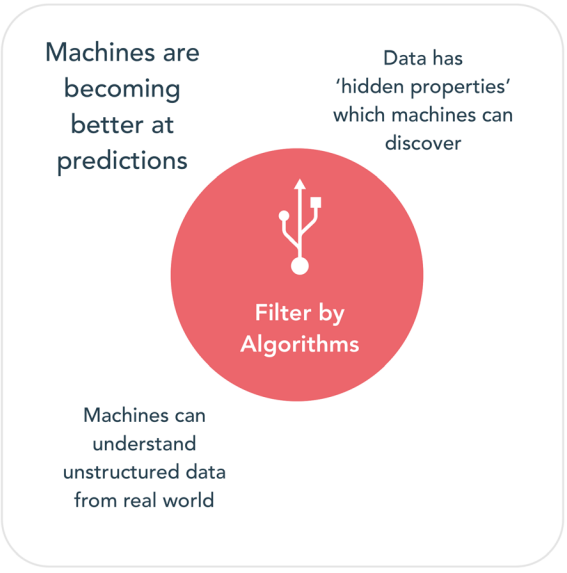


Figure 20. Sub-Cluster - Filter by algorithms

information. We constantly use algorithms to the right kinds of information, bypassing the redundant. For example, there are millions of videos on YouTube which one might enjoy, hence YouTube generates recommendations from carefully designed algorithms, so that the users get exactly the videos they want to see, and the rest is filtered away. This is also linked to filtering by identity. This is shown in **Figure 20**.

The following factors make up this sub-cluster:

- Machines are becoming increasingly better at making predictions in all walks of life by understanding hidden patterns in data
- Machines are getting better at understanding unstructured data from the real world
- Data contains 'hidden properties' which can be brought out by predictive analysis

Filter by Identity - filtering out the uninteresting

Finally, we deal with a complex world by filtering it with our identity. What is interesting for one person, may not be interesting for another, but people approach the world through

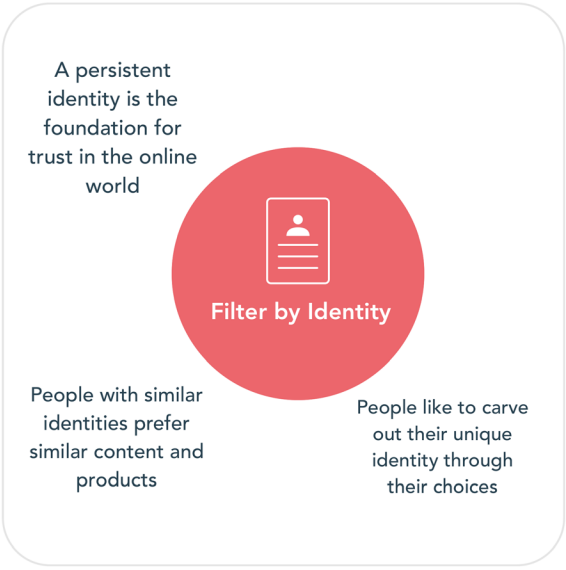


Figure 21. Sub-Cluster - Filter by identity

their unique identity and filter out what does not easily fit into that identity. This is shown in **Figure 21**.

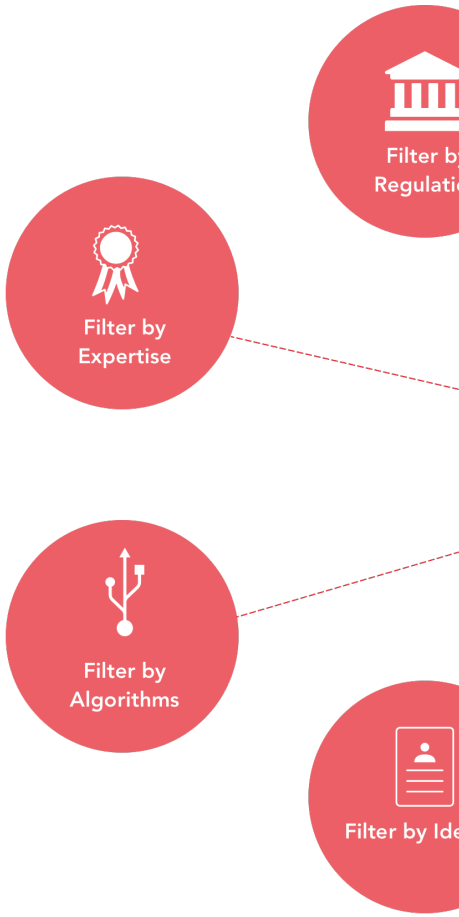
The following factors make up this sub-cluster:

- People like to carve out their unique identity through their choices
- A persistent identity is the foundation for trust in the online world
- People with similar identities prefer similar content and products

Thus, we can see an exponential world which can be accessed through multiple filters. This is visualised in **Figure 22**.

Entrepreneurs are Heroes

Another major clusters is around understanding entrepreneurs. With their willingness to go against the grain,



with their willingness to take big risks, and with their extreme care for their team-mates, it is not an exaggeration to say that entrepreneurs can be seen as brave heroes. They are people who are willing to sacrifice their peace of mind and financial comfort so that they can create a better world for their team and their customers.

However, there are slight differences between startup entrepreneurs (who create a product) versus agency entrepreneurs (who provide a service). The former face more oppositions as they pursue new ideas and hence the failure rate is very high. At the same time, if they succeed, their scale of impact is also very high. They usually grow through

funding from outside investors, typically venture capitalists. They also try to grow faster. For the latter category (service or agency businesses, like a restaurant), the challenges lie more in dealing with client demands and nurturing relationships. But rates of failure are low and they generally do not take external investment.

However, fundamentally, both types of founders deal with uncertainty and immense time pressure. But maybe the

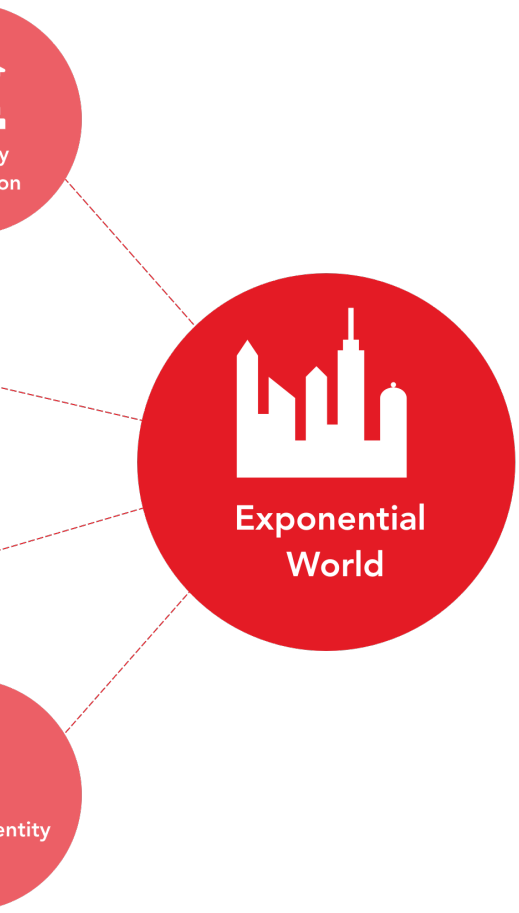


Figure 22. Filters on the Exponential World

human principle of being part of fantasy worlds - which are exciting and improbable, excites them enough to persevere in face of immense odds. This is shown in **Figure 23**.

The following factors make up this cluster:

- Entrepreneurs want to create a personal impact on the world
- Startup entrepreneurs are idealists - they believe in improbable futures
- People like to be a part of fantasy worlds
- Good Entrepreneurs are always thinking about how to grow their business
- People want to pursue personal growth, exploration, and learning
- People want to feel freedom and control in their life
- Startup Entrepreneurs are obsessed about building their team
- Entrepreneurs feel they never have enough time for strategic work
- Entrepreneurs face painful periods of financial 'gaps'
- Agency businesses face challenge of balancing the needs of clients and team

Accounting is a Magic Box

The attitude of entrepreneurs towards accounting was that of cautious avoidance. Almost as if accounting was a mystery. On the one hand, they know the importance of accounting and can recall some instances where accountant made significant difference to their business. On the other hand, they are not interested in learning about accounting and would rather let the accountant do the books.

Their anxiety about accounting is driven by two key factors - they do not want to get in trouble with the government for things they don't know, and they feel a pressure with deadlines

Figure 23. Cluster - Entrepreneurs are heroes

for various accounting tasks. While they generally tend to avoid dealing with accounting, most entrepreneurs do realize that accounting can add a lot of value to their business, they are just not sure exactly how.

It is important to note that the magic box of accounting is dynamic, and not static. The exponentially complex world necessitates changes in laws, and many times laws related to taxation.

Figure 24. Cluster - Magic box of accounting

The following factors make up this cluster:

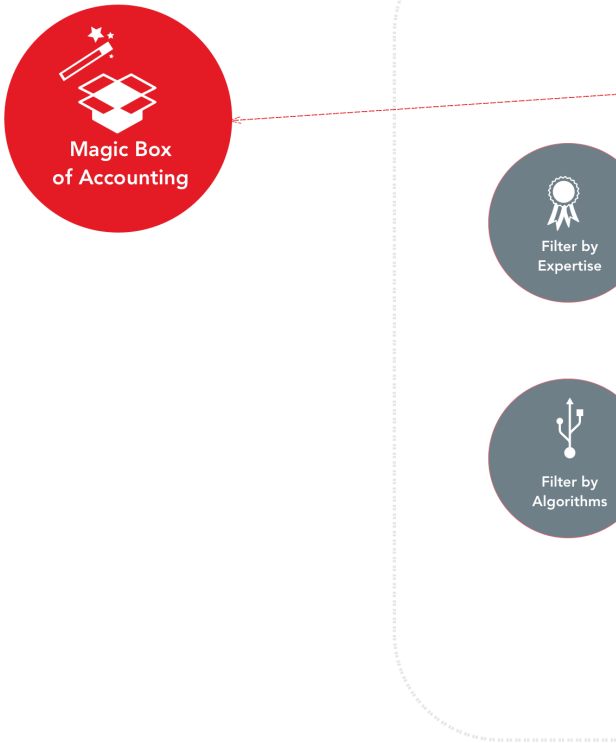
- Most SMEs and Startups have one specific co-founder taking care of the accounts, other focusing on sales or product
- Entrepreneurs are anxious about Accounting Laws because they want to avoid trouble with government
- Entrepreneurs trust their accountants 'slavishly'
- Entrepreneurs do not spend much energy and time in finding the right accountant
- Entrepreneurs don't know how much value the accountant adds to them
- Entrepreneurs want accountants to add value through proactive advice
- Tax and legal language is not 'human readable'
- Entrepreneurs approach accounting with a mixture of boredom, fear and delight

We can also see how more complex world would need more laws and regulations which would make the magic box of accounting more complex, that is, more magical. This is shown in **Figure 25**.

Accountants are like Mothers

This was the most interesting insight which popped up from the clustering. While in most cases the accountants are seen as coaches, the interviews brought out a more interesting metaphor - active mothers of naughty and energetic children.

The parallels are striking. As mentioned in the previous section, the entrepreneurs try to avoid accounting, but the accountant always wants to remain close to them. Almost all the accountants had clients who were close to them geographically. They cited the value of being in the same region as the entrepreneurs. One reason they want to stay



close to entrepreneurs is that this gives them opportunity for more face to face meetings. These face to face interactions let them truly understand what the entrepreneurs need. This lets them infer things which the entrepreneurs mean, but are not able to articulate. In fact, according to some accountants current digital tools make communication worse due to more misunderstandings.

This contrasts clearly with entrepreneurs who do not seem to care much, but approach the accountants only when they are faced with difficulties they cannot handle. Entrepreneurs tend to approach accountants when there is some change in some law or key regulation, much like a child approaching his mother when he or she is hurt, or in trouble.

Moreover, every entrepreneur has one accountant, but every accountant has to take care of multiple entrepreneurs, with different personalities, different working styles and different business structures. The accountant has to be always available to the entrepreneur's demands - even at evenings and weekends. This is shown in **Figure 26**.

The following factors make up this cluster:

- Accountants prefer to have face to face interactions with their clients
- Accountant's experience helps to interpret their clients' unspoken needs
- Accountant involvement increases in case of 'unforeseen events' for entrepreneurs

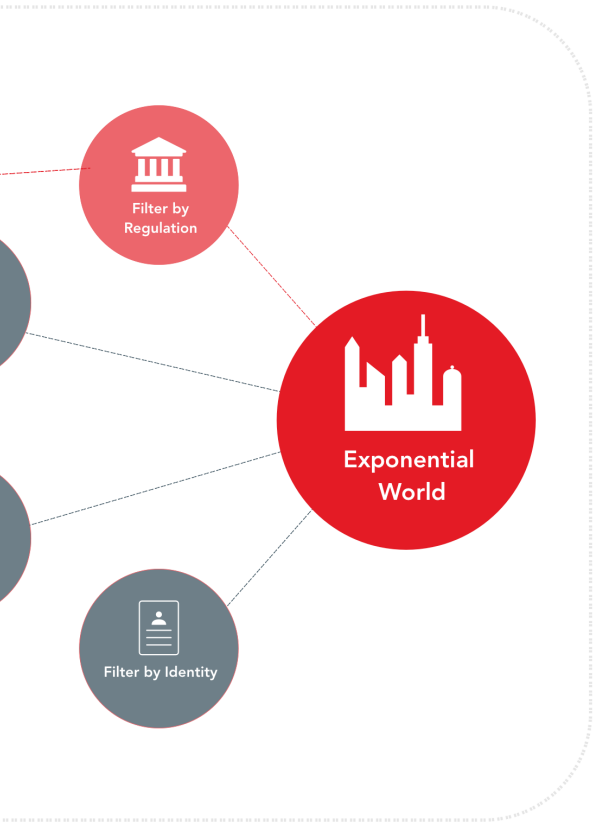


Figure 25. The increasing regulations make the 'magic box' even more magical

- Accountants are flexible to 'real-time' demands of entrepreneurs
- Accountants worry about their advice not being listened to, hence they prefer phone or in-person meetings
- Accountants prefer their clients to be geographically close

Figure 26. Cluster - Accountants are like mothers

- Accountants deeply care about Entrepreneurs
- Accountants are always looking for new opportunities for their clients
- Accountants wear many hats - coach, sparring partner, compliance checker
- Different business structures have different growth priorities

We can now also see how this cluster relates to the other clusters (shown in **Figure 27**). The Accountants can take the insights from the magic box and provide them to the entrepreneurs. At the same time, with their business experience and expertise,

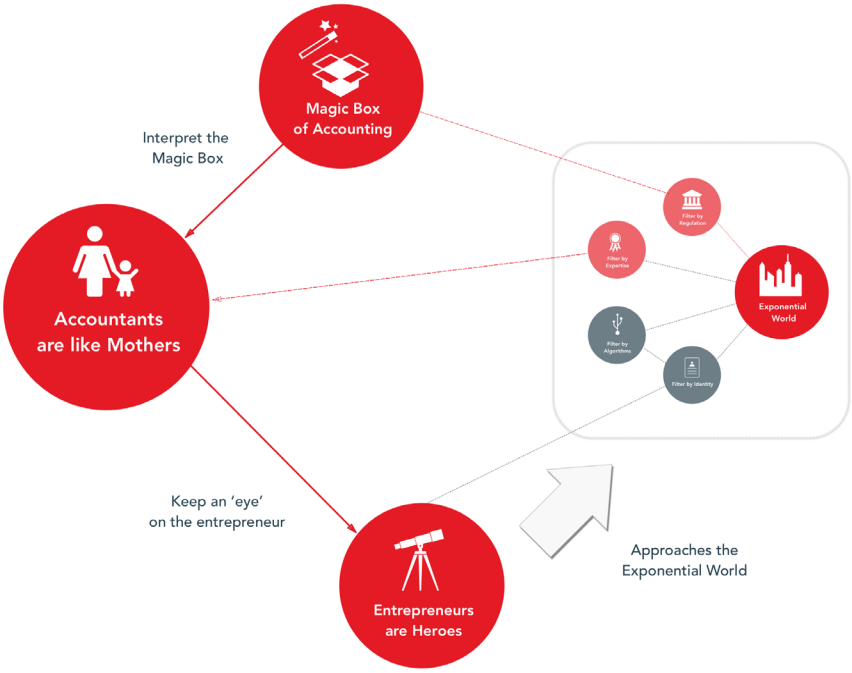


Figure 27. Accountants can interpret the 'magic box' and use the findings to keep and eye on the entrepreneurs

they also filter the exponential world and provide relevant insight to the entrepreneurs.

We can further evolve the context by seeing that the entrepreneur, as a hero, takes on the exponential world. She wants to create an impact in this world. Under the watchful eye of the accountant, the entrepreneur can approach the exponential world. This further evolves the future context to the figure shown below.

Moreover, we connect the 'filter by identity' to the entrepreneur as we know that entrepreneurs go into business in a field which they already know about, and is thus a part of their identity. Also, we connect, the 'filter by identity' to the 'filter by algorithms' because algorithms rely on data about identity to filter content from the world. We now look at the other clusters and see how they relate to the existing clusters.

Mental Minefields

The human mind has a lot of biases because they evolved to survive in a primitive environment. However, in a complex environment, these heuristics often work against us. We can make stories from little data, because our minds crave coherence. At the same time, information overload and distractions can make us paralyzed and lead to poorer decisions. To make things worse, a good mood can make us less vigilant and hence more prone to make mistakes. At the same time, a good mood is helpful in coming up with new ideas.

Our minds are also drawn more towards the bizarre events of the world - which makes us overestimate their probability.
In an exponential world, entrepreneurs have to take special care to navigate these minefields. This is shown in **Figure 28**.

The following factors make up this cluster:

- In a complex world, we aggressively filter information using heuristics
- Good mood makes people more creative, and less careful
- People are not good at telling exactly 'why' they like or dislike something
- People assign much greater importance to the first number they see in any context
- People make errors of judgement from finding stories in sparse data
- Information overload leads to poor decision making
- Bizarre, Funny and Visually Striking things capture human attention

These mental minefields are an inescapable part of the world and everyone is susceptible to them.

In the next step, we look more closely at how entrepreneurs approach the exponential world.

Strategies for Attack

To deal with the exponential world, entrepreneurs develop strategies for attack. They use the tools which they are comfortable with, and experiment with things before committing to them. They also use outside help beyond their domains using strategies like crowdfunding. They realize the value of data driven decision making are willing to give up personal data to get more customized tools - which make them productive.

Figure 28. Cluster - Mental minefields

Figure 29. Cluster - Strategies for attack

The 'Lean Startup' method can be seen as a response to the exponential uncertain world. In this method, creators rapidly prototype and experiment with a lot of ideas in the market instead of spending too much time thinking and planning about product strategy. These approaches also give them the critical speed advantage needed when working in competitive markets.

In their strategies for attack, they seek engagement and empowerment. This is shown in **Figure 29**.

The following factors make up this cluster:

- Centaurs (Human + AI) create the best combinations for performance
- People are realizing the value of data-driven decision making
- People like to try things out before committing to them
- In a rapidly changing world, speed of execution becomes critical factor of success
- People like tools which they can adapt according to their wish and needs
- People like to receive information in real-time
- Seeing multiple options for a decision makes logic dominate intuition
- Avenues of recovery make people more confident in trying unfamiliar things
- People from outside a field can sometimes give better solutions than the experts
- Small mistakes with feedback help in making right decisions
- People are willing to give away data for convenience which comes from personalization

Figure 30. Cluster - Strategies for defense

Strategies for Defense

Finally, most people, and entrepreneurs in particular have multiple defensive strategies to avoid making mistakes and feeling psychologically comfortable while dealing with growing uncertainty. A large part of being defensive involves looking at parameters of trust. Maximizing trust means dealing with people they know and they like, and trying to have direct and transparent working relationships. This is shown in **Figure 30**.

The following factors make up this cluster:

- Entrepreneurs tend to start companies with people they already know
- People value transparency in their transactions
- People are willing to pay for something when they know it has clear value for them
- People with different personalities, backgrounds, and values find it difficult to communicate productively
- People do not like intermediaries, middlemen, or third-parties
- People value the feeling of security which comes from being part of a community
- Trust is an extremely valuable commodity
- People cherish the feeling of being understood

We can see that in the future context entrepreneurs will use both the strategies for attack and defense when dealing with the exponential world - shown in **Figure 31**.

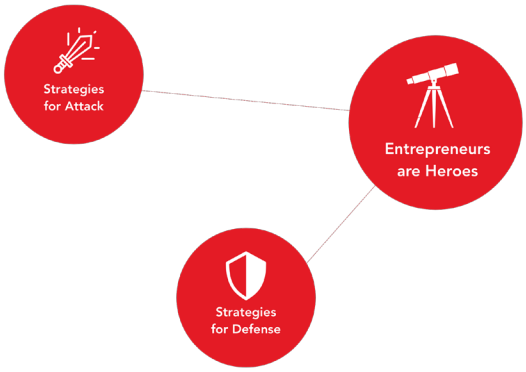


Figure 31. Entrepreneurs use multiple strategies

Hidden information goldmines

While the data is exploding in this world, there are still a lot of information sources which are not accessible, and even if they are accessible, they are not 'searchable'. And in some cases, even if they are 'searchable', they are not searchable easily. For example, it is not easy to 'google' a conversation we have on our phones, even if that conversation is stored in a secured way. Similarly a lot of information in face to face interactions (in-person, or on video) is lost. This information does not only contain the specific words spoken, it also contains details of

personalities of participants and their emotional reactions to events.

Consumer companies like Facebook and Business tools like Slack are trying to capture the emotions of people with reactions and emojis. But emotions are not captured for a vast majority of human interactions.

However, machines are getting better and better at looking at these information sources and finding their meaning. Machines can now read emotions from faces and analyse

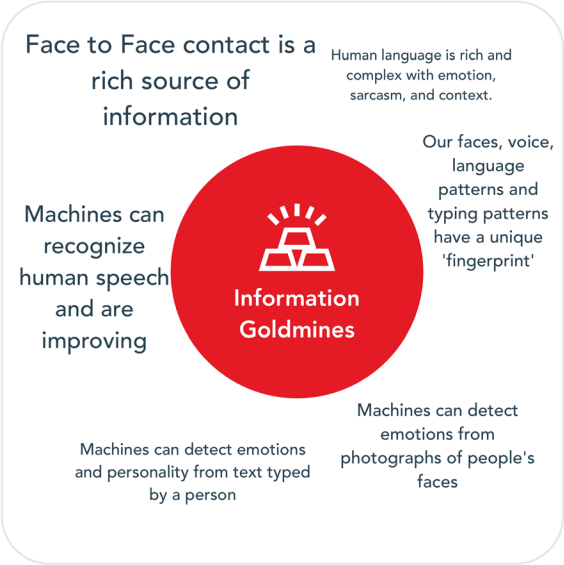


Figure 31. Cluster - Information goldmines

personality from text. The future could have more tools which make better use of this data. This is shown in **Figure 31**.

The following factors make up this cluster:

- Face to Face contact is a rich source of information
- Our faces, voice, language patterns and typing patterns have a unique 'fingerprint'
- Human language is rich and complex with emotion, sarcasm, and context.
- Machines are getting better at recognizing human faces accurately
- Machines can recognize human speech and are improving
- Machines can detect emotions from photographs of people's faces
- Machines can detect emotions and personality from text typed by a person

We represent the interaction between accountant and entrepreneur to be the source of the goldmine in the following way.

Also, these information goldmines can be used to empower

Figure 32. Information goldmines are a part of relationship

the entrepreneurs through both strategies for attack and defense. That is, the hidden data captured from entrepreneurs and accountants relationship can be used to provide better strategies to the entrepreneurs to approach the exponential world through attacking or defensive approach. This is visualized in **Figure 32**.

Section 5.1 outlined all the individual clusters and mapped out how they relate to each other, one by one. We will see how they are brought together in the next section.

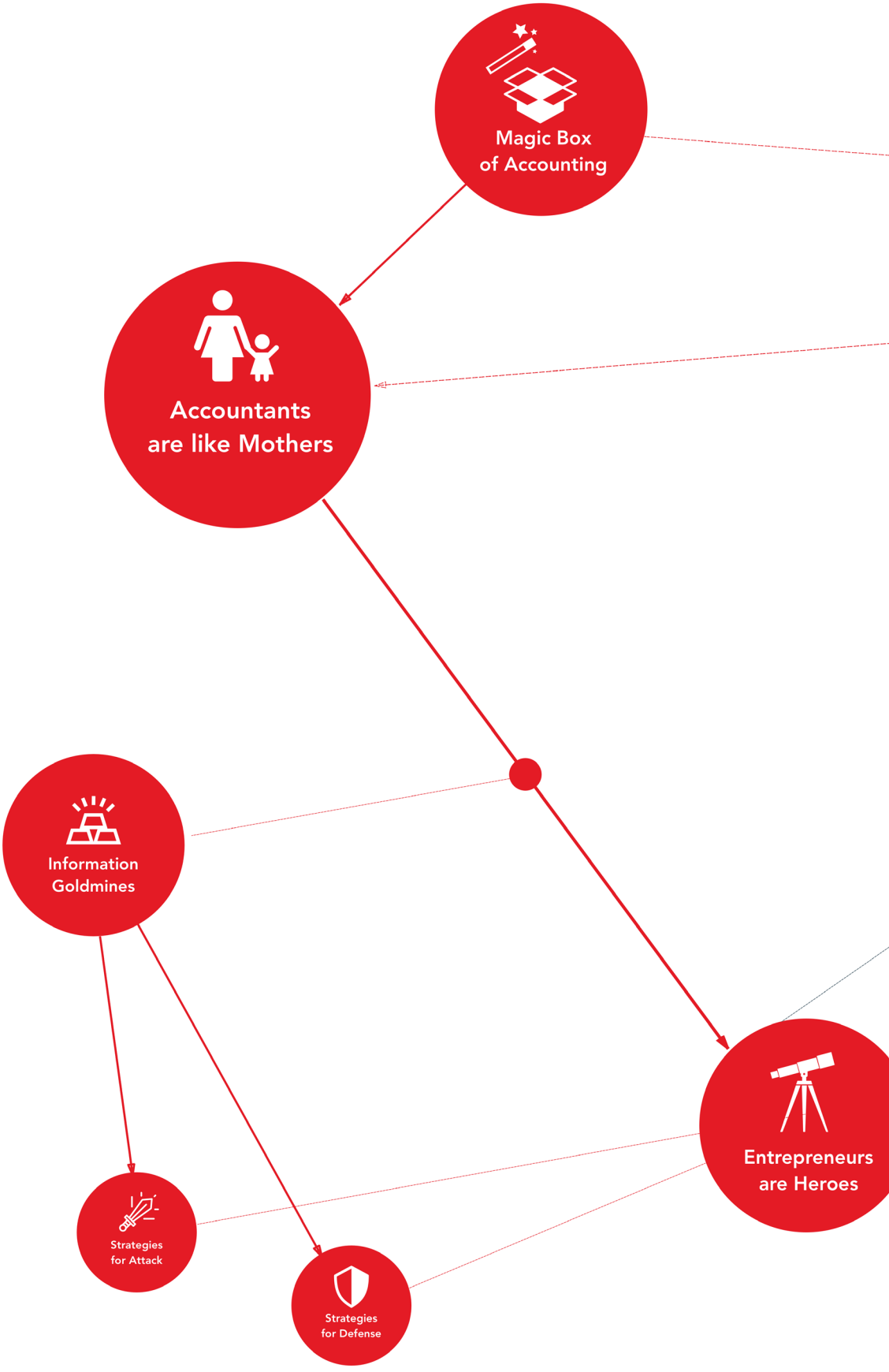
5.2 The Future Context

All these clusters can be tied into a coherent vision for the future.

This future shows an exponential world which is approached for its opportunities by the entrepreneur. Entrepreneurs use both attacking and defensive strategies when approaching this world. The world has a filters through which people understand it. The regulations feed the 'Magic box' of accounting, making it even more complex. Also, accountants act as advanced experts to filter the complexity, and they can read the contents of the magic box of accounting.

Accountants keep a mother's eye on the entrepreneur, and this interaction is an information goldmine which is not captured by current tools. This goldmine might be used for both attacking and defensive strategies.

In this section, we saw, step by step, how the future context was created. First, we saw how the clusters were articulated from context factors, and then we saw how the clusters related to each other. Finally, we ended up with a coherent vision of the future, which opens up many possibilities for products. However, now the more subjective work of the designer begins, and in the next section I will articulate the vision and qualities for the future concept. All of these will be rooted in the future context as defined in this section.


Magic Box
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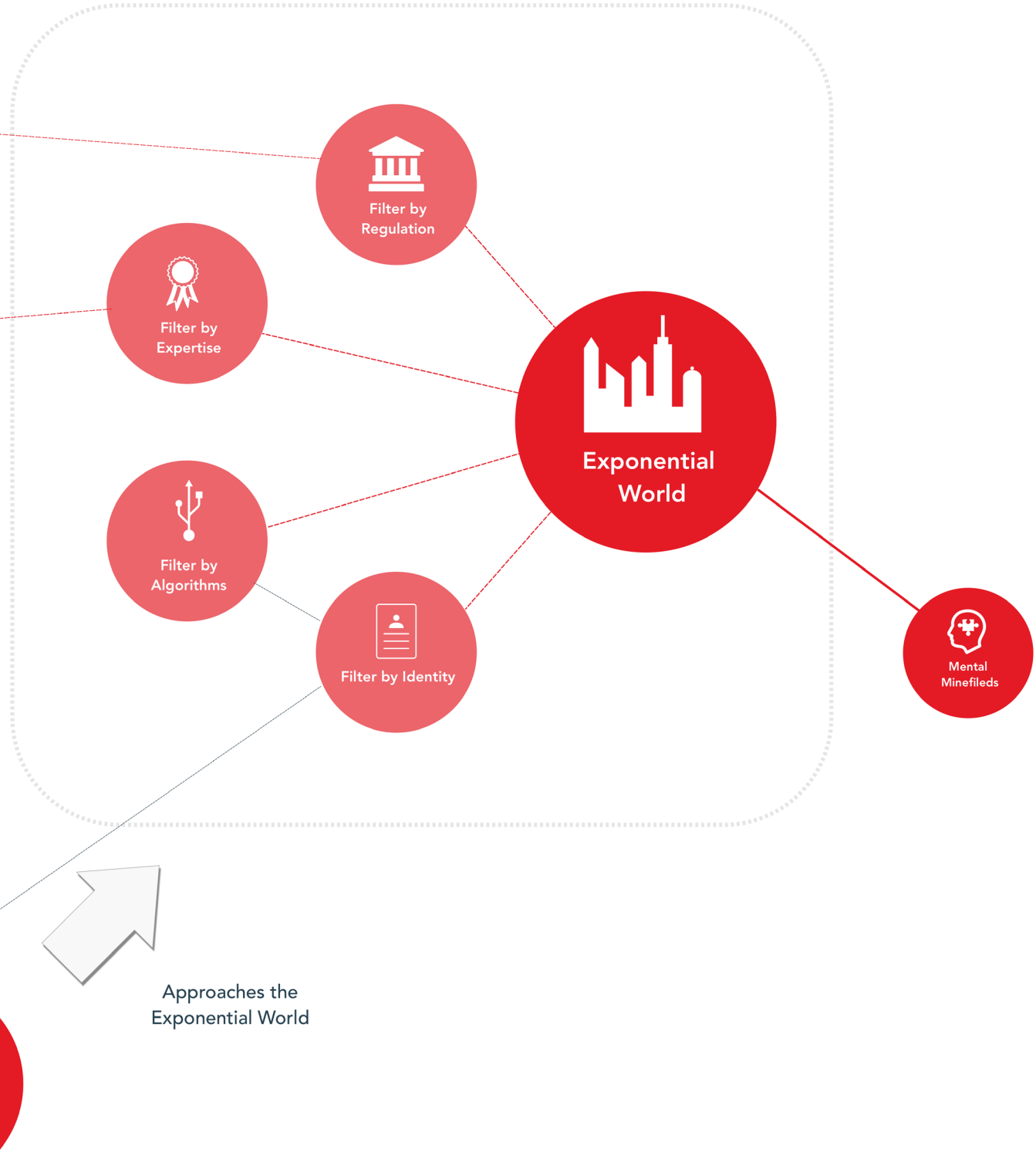


Figure 33. The future context

CHAPTER 6

Concept Design

The story of making a vision **come alive.**

6.1 The Vision Statement

In this section, we create a vision statement which defines what product is to be offered to the world. This process is also iterative and will be explained below.

I started with this statement:

I want people to feel more confident and secure in taking financial decisions by bringing them insights from their internal and external worlds.

However, this seemed too open. I wanted to make the entrepreneurs more empowered, and not just people in general. Similarly, this statement missed the role of accountants as mothers, which was a particularly strong cluster. Hence, I made another iteration, this time trying to look at the relationship:

I want the entrepreneur-accountant relationship to be enriched by bringing them insights from both the outside and inside worlds. The outside world is the external world while the inside world is their relationship itself.

However, this statement sounded too close to the domain, and did not really capture the clusters. Moreover, personally, I wanted to focus on the benefit to the entrepreneur and not just the relationship. Hence, I made another articulation:

I want entrepreneurs to feel delight by discovering financial opportunities in an exponential world by bringing them insights from accountants.

This one sounded better. The focus was on entrepreneurs and the exponential world was also addressed. But I felt this was going against the very purpose of Exact software, as well as the field of accounting itself. I believe the purpose should be to give a sense of security and control, so that the entrepreneurs can choose and the delightful parts of the world themselves. Hence I modified the statement again:

I want entrepreneurs to feel a sense of control over their financial performance when navigating an exponential world by bringing them insights from their accounting data.

This was much closer to what I wanted to express, but I still wanted to highlight the role of accountants directly, as the words 'accounting data' feel impersonal. I also wanted to include the power of technology, which was missing from all these statements, as well as highlight the emotional dimension of their relationship. This resulted in the final vision statement:

Based on this future context, the vision statement is articulated as shown on the next page.

The reasoning for this statement further explained as follows:

- **Sense of control**: This is because entrepreneurs can feel overwhelmed by the tasks ahead of them. They need control to feel confident enough to face an uncertain world.
- **Financial Performance:** This is the domain and it is critical for survival of the company. This is also where the accountant adds most value.
- **Exponentially growing world:** This world is complex and uncertain. And both knowledge and ignorance grow exponentially, and not linearly. Exponential world is also a key cluster from the future context.
- **Advanced technologies**: Technology grows very fast and latest tools are generally the most powerful. I want to leverage the most powerful tools to deliver the best outcomes for them.
- **Expertise of Accountants:** They can filter information from an exponential, complex world, and bring the relevant knowledge to the entrepreneurs.
- **Emotional Intelligence of Accountants:** Accountants care like a mother for entrepreneurs. They should also provide emotional comfort and a 'click' - something which makes the entrepreneurs feel comfortable with the relationship.

6.2 The Human-Product Interaction

The interaction denotes the relationship between the user and

I want entrepreneurs to feel a **sense of control** over their **financial performance** when navigating an **exponentially growing world** by combining the power of **advanced technologies** with the **expertise** and **emotional intelligence** of accountants.

the product, without defining the product. It is defined with words and can also be defined with analogies.

For the new product concept, the interaction is defined by an analogy - **of talking to a wise friend.**

Why is meant by 'friend'?

Our friends are people who care about us, as well as understand us. Our family members care about us, but sometimes they may fail to understand us, especially after we grow up.

Similarly, there may be perceptive acquaintances who can understand us, but do not care much about us. However, a friend does both.

What is meant by 'wise'?

However, caring and understanding are not enough. A truly beneficial friend should be wise and discerning. She should be able to give good advice in both good and bad times. When we are feeling low, the good friends can make us feel better by showing our troubles in perspective. They can provide helpful and intelligent advice when we are facing troubles, and also tell us about opportunities or perspectives we didn't know existed.

Another reason for choosing a wise friend as an analogy is that friends do not try to dominate us. They help us without expecting anything in return. Thus, they help us in feeling a sense of control and autonomy in our life. This analogy is also rooted in the context factor that most entrepreneurs start companies with people they already know. Most of the times, these are their friends.

The interaction with the final product should feel like conversations with a wise friend. This interaction will give the entrepreneur a 'sense of control' by using the 'expertise' and 'emotional intelligence' of the accountants.

6.3 Defining Product Qualities

In this section we define the characteristics which define the product at a qualitative level. They can relate to product personality as well as be more direct physical qualities.

For the product we define the following qualities:

- "Intelligence"
- Fluid Adaptability

We will take a look at these one-by-one.

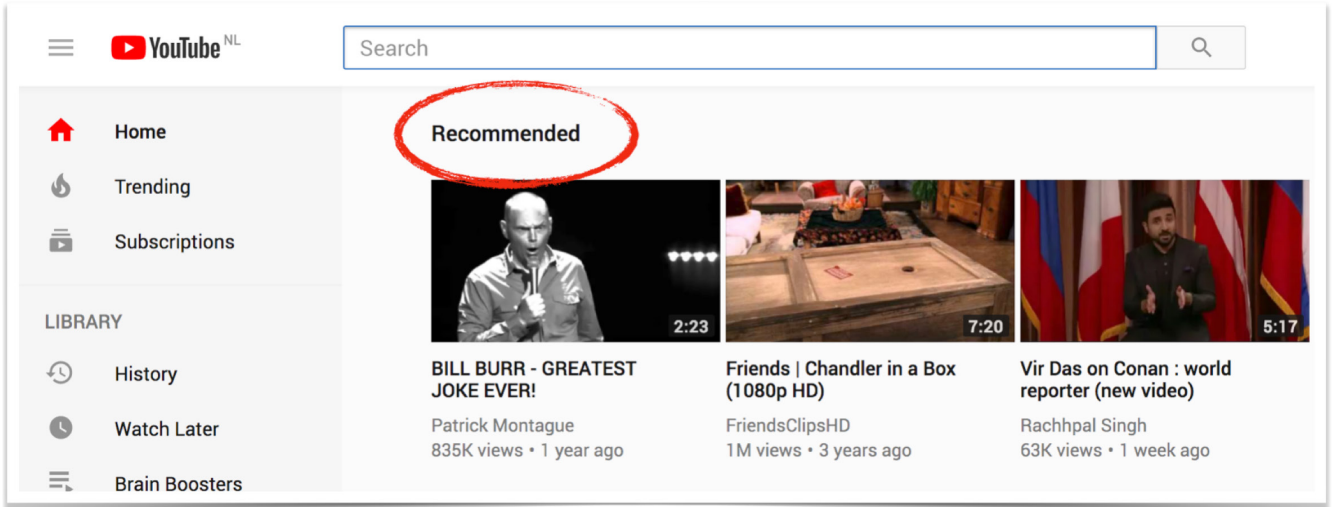
"Intelligence"

Here intelligence means 'smartness', as in smartphones. The augmented intelligence of men and machines, as well as dimensions of emotional intelligence. In a more basic way, this means intelligence in the sense of anticipating what will happen and acting according to it. As we know from the context factors, machines are getting better at understanding data, finding patterns and thus predicting the future. This kind of pattern-matching defines the core of the product's intelligence. For example, the recommendation algorithms on YouTube are intelligent (shown in **Picture 6**) - they serve users recommended videos which fit the user's needs and desires.

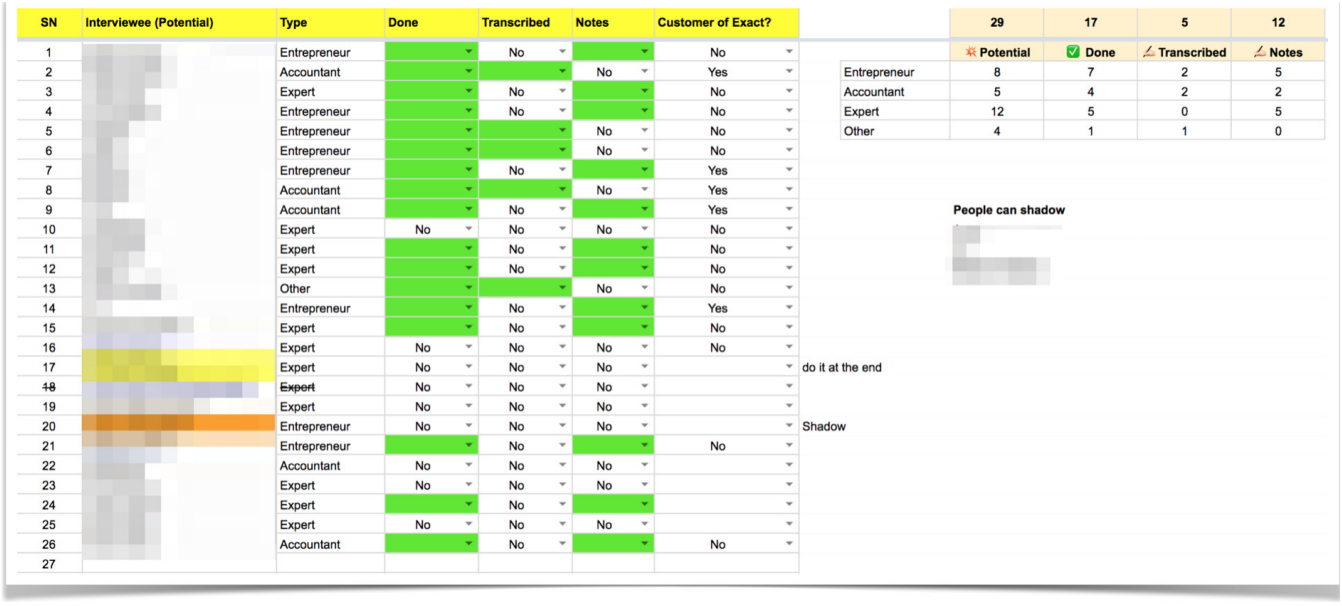
Sheets (shown in **Picture 7**) and MS-Excel are adaptable, the entrepreneur can give them any shape he or she wants.

However, such tools can also give a feeling of 'rigidity', with clearly shaped boxes. I want the product to be more fluid, and hence feel more natural. For example, the 'pull to refresh' interaction in Gmail app on iOS (shown in **Picture 8**) feels very fluid.

However, this is fluid but not adaptable. An example which combines both is interaction of arranging apps on iOS home



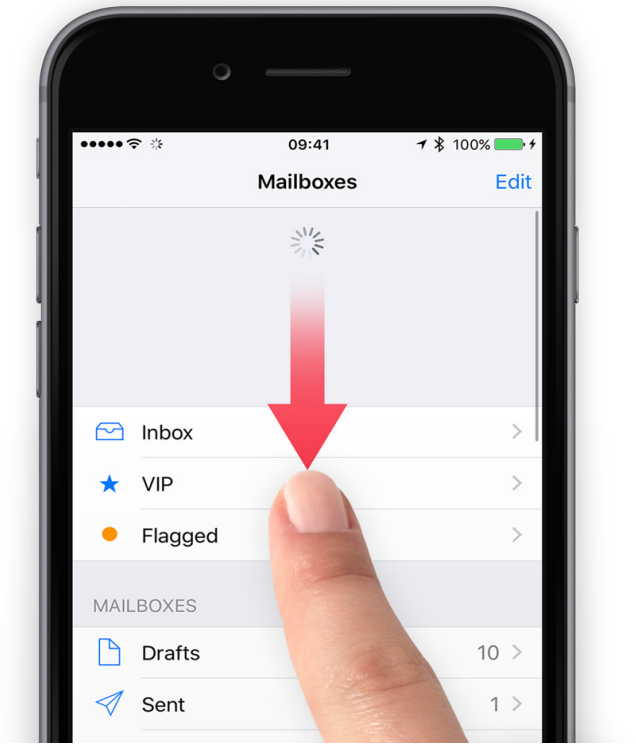
Picture 6. Recommended Videos on YouTube are selected by ML algorithms



Picture 7. Google Sheets presents a lot of options for the user to customize the application

Fluid Adaptability

The product should be adaptable. That is, the user should be able to give shape to it as needed. This will help them in feeling a sense of control. For example, the software tools like Google screen. This is shown in **Picture 9**. In this interaction, the user can adapt the home screen by touching the icons and moving them around. This interaction feels fluid and easy, thus giving the user a feeling of comfort and control.



Picture 8. Pull-to-Refresh gesture on Gmail in iOS

Picture 9. Moving application icons on iOS on iPhone

6.4 Problem Statements & Pain Points

In order to clearly define the product concept, separate problem statements and clear pain points were defined for both entrepreneurs and accountants in a simple language. This helped in narrowing down the scope of the assignment and making the design task more tractable.

Entrepreneur Problem Statement

"Most entrepreneurs find that accounting is a confusing mess. They have no time to understand accounting jargon when they are busy growing their business. They call the accountant again and again for the same questions, and feel anxious about dealing with complex laws and regulations."

Entrepreneur Pain Points are:

- Not enough time for strategic tasks
- Find accounting language complex and boring
- Worry about getting in trouble if accounting is not done properly
- Need to use multiple tools to manage accounting tasks

Accountant Problem Statement

"On the other hand, accountants find it difficult to grow their business outside their nearby geography. They need face to face meetings to truly understand their clients, and provide better, more compassionate advice. After all, every client is different. But with today's traffic conditions, regular travel to large distances is simply not feasible."

Accountant Pain Points are:

- Desire to focus their business on advice - want to get away from routine tasks
- Want to see entrepreneurs face to face
- Don't want to repeat their advice
- Want to know where they can add most value

6.5 Concept Design

After clearly understanding the vision and problem statement, the design phase was undertaken with creating personas for entrepreneurs and accountants, and then creating a scenario for using the product. Based on the personas and scenario, ideations were done with sketches and wireframes of varying fidelity to arrive at the final solution.

Personas

The design phase began with defining a few personas which were relatable to the research. These personas were indicative of the target users of the product. Personas were defined for both the Entrepreneur and the Accountant. The target users for entrepreneurship were taken to be the SMEs which have 10 to 50 employees - because they are the strategic focus for Exact. For accountants, the target users are experienced accountants who want to focus on advice. This is because most routine accounting jobs in 2025 will either be automated, or provide very little revenue for accountants.

This entrepreneur has a company with 18 people, and hence needs the accountant more than someone who has less than 5 employees. The entrepreneur is named Tobias and is called 'Toby' in short (shown in **Picture 10**). To give a better sense of the world in 2025, it was assumed that 3D printing would become much more popular with the people, and this would create a need for materials for 3D printing. This will be a manufacturing business which will involve machinery and a supply chain.

Similarly, an Accountant persona was defined based on interviews with real accountants. He is named Daan. His persona is shown in **Picture 11**.

Finally, a persona was defined for the voice assistant 'Lipi'. This persona was in line with product qualities - it was designed to reflect the qualities of 'wise friend'. Lipi's persona is shown in **Picture 12**.

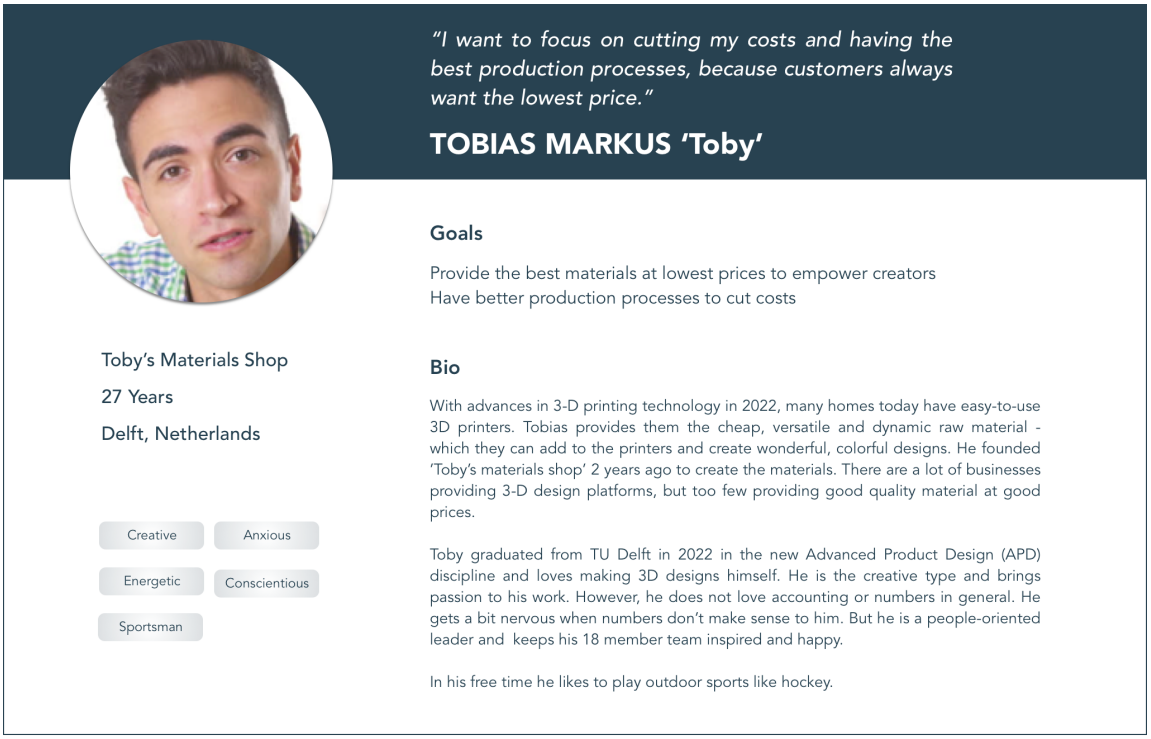
While the entrepreneur is based out of Delft, the Accountant is based out of Amsterdam, hence, traveling is limited. This is a real problem faced by accountants, when they need to travel to meet clients face to face. The accountant is someone with experience in dealing with different kind of clients and has an appreciation of the importance of emotional intelligence.

Scenario

A scenario with entrepreneur and accountant was constructed to better visualize the day to day context of entrepreneurs and accountants. This helped in coming with new features which would fit into their workflow. The scenarios were created with rough sketches (sketches are present in Appendix A10) but in this section, they are presented with the actual product, to illustrate the use case better.

Entrepreneur Scenario

It is October 2025, and a fine Monday morning. Toby gets up checks out the news on his phone from his bed (shown in **Picture 13**). Toby is addicted to his smartphone and always keeps himself updated on what's going on in the market and in the broader world. Today, he finds that a new materials innovation at MIT labs has the potential to reduce his costs by more than 50%. His business is cost-driven and he is always



Picture 10. Persona for the Entrepreneur

"I want to understand my clients at a deeper level, their insecurities, their emotions, so that I can help them with both IQ and EQ."

DAAN VAN AMSTEL

Van Amstel Accountants

41 Years

Amsterdam, Netherlands

Experienced | Relaxed | Competent | Conscientious | Reader

Goals

Help Entrepreneurs realize their potential
Expand business by having more clients - while preserving quality of advice

Bio

Daan is an experienced accountant. After completing his accounting studies from Vije University Amsterdam, he worked at the Amsterdam office of Deloitte for 10 years.

This gave him deep experience in the accounting practices of firms of different scale levels - from the smaller companies to large MNCs. Just around a year ago, he, with another friend, decided to go into the business of accounting himself as he valued his independence and also wanted to work with younger companies.

Daan thinks seriously about people and wants to make a solid contribution to the world. He knows that clients not only need expertise, they also need a helping hand and patient ear in facing business challenges.

In his free time he likes to read books on History and Finance.

Picture 11. Persona for the Accountant

"I am always there at the call of the users. I try to provide relevant information as quickly as possible and then get out of the way."

Lipi

Lipi Voice Assistant

Age: NA

Location: Centaur Cloud

Polite | Helpful | Efficient | Non-Intrusive | Intuitive

Goals

Provide users with information when they need it
Make users faster and more effective

Bio

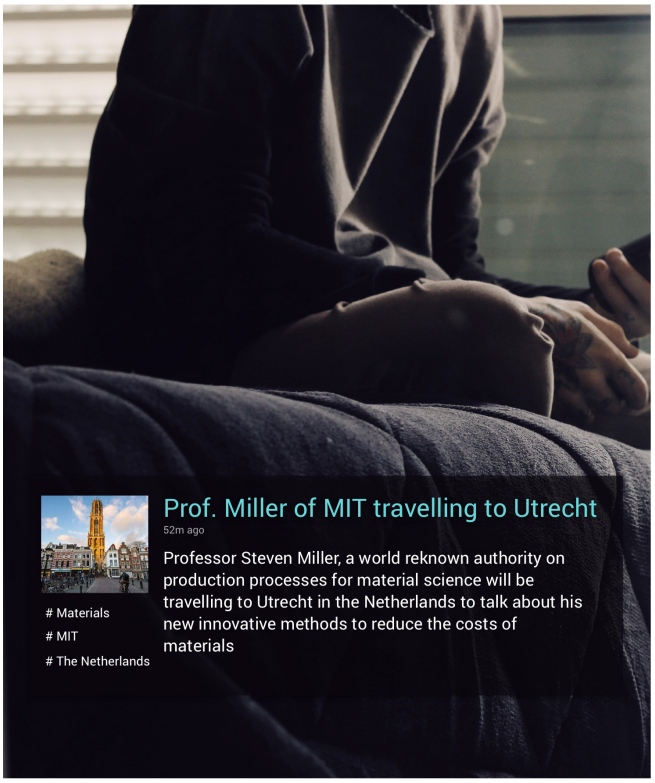
Lipi is designed to help the entrepreneur and accountant do a variety of tasks with ease.

Lipi can perform the following tasks:

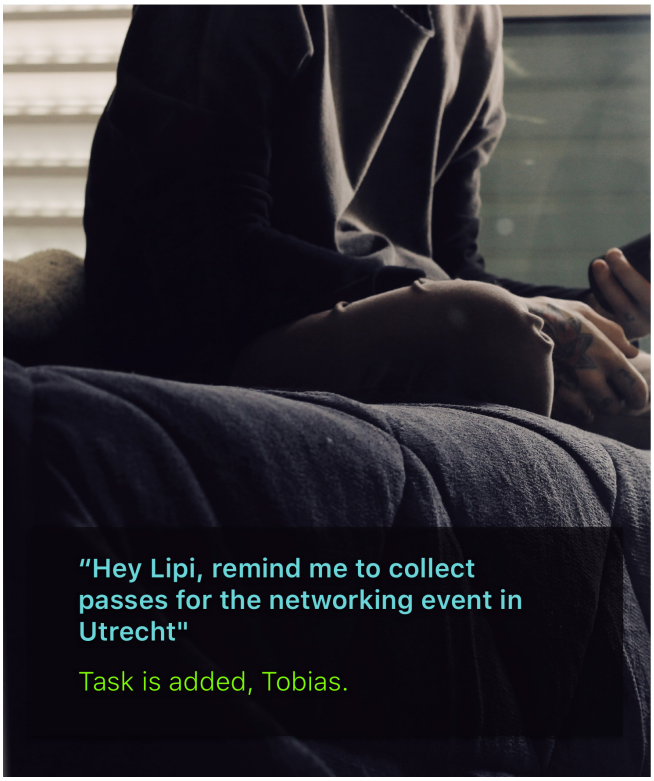
- Handle simple and complex queries
- Generate and display dynamic charts
- Display summaries of past conversations
- Make Calls to accountant
- Add Tasks to task list
- Access and display documents

If there is a task which Lipi cannot handle, it asks the entrepeneur to create a task to ask the accountant about the information.

Picture 12. Persona for 'Lipi'



Picture 13. Toby checks news in the morning



Picture 14. Toby asks Lipi to set a task

looking for ways to reduce them. The innovator, Prof. Miller, is traveling to Utrecht in a month for an industry event. He needs to get passes to this event and meet the Professor in person.

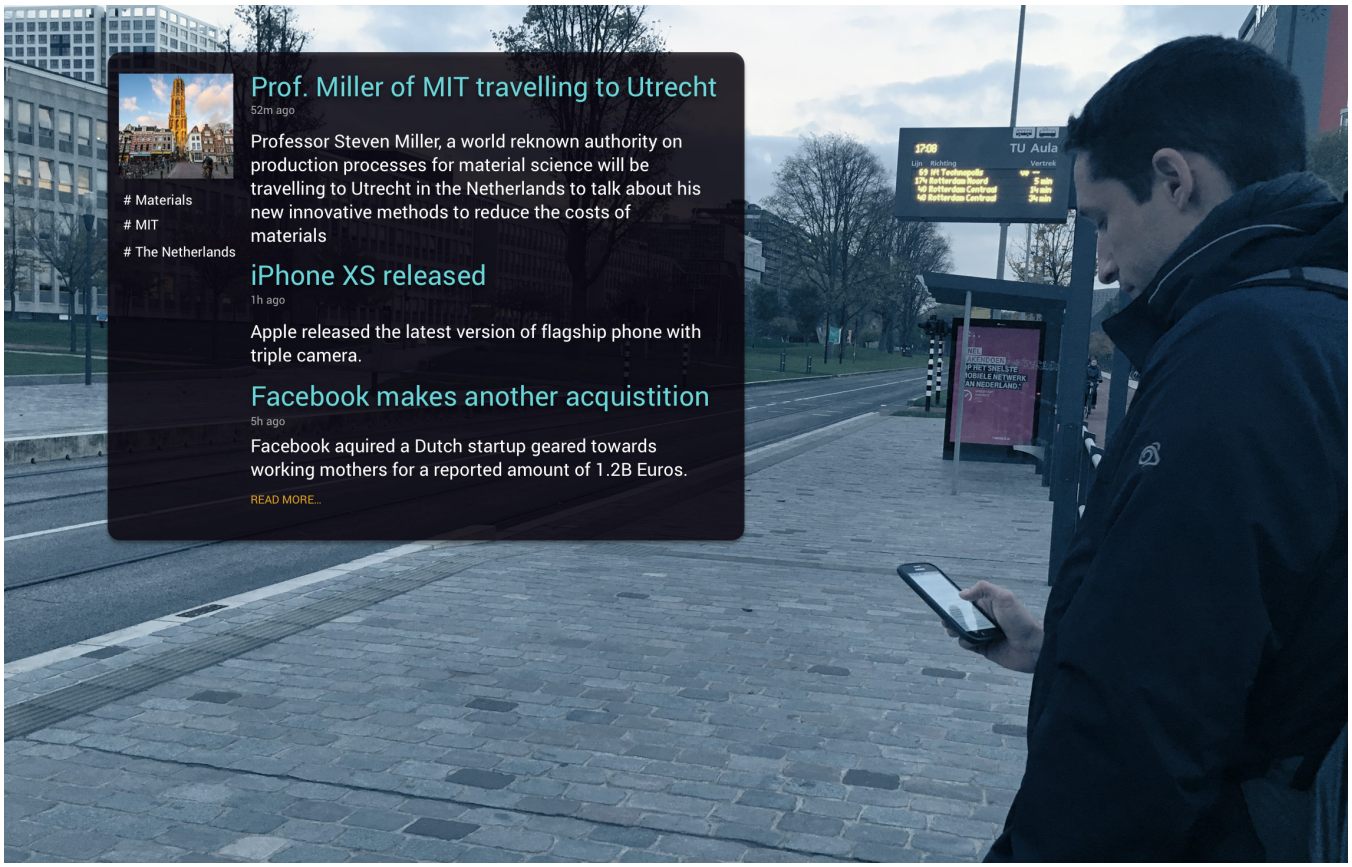
He asks Lipi to add the task to his task list. This is shown in **Picture 14**.

Finally, he gets ready and reaches his office in Delft, just near the Delft Technopolis Bus Stop. He prefers to take public transport because self-driving buses are much cheaper, and he likes to use his bike only if the weather is very good. He keeps looking at news updates on his phone (**Picture 15**) even when waiting on the bus stop to learn more about what is going on in the industry and the world in general. Always being updated is Toby's strategy for attack in an exponential world.

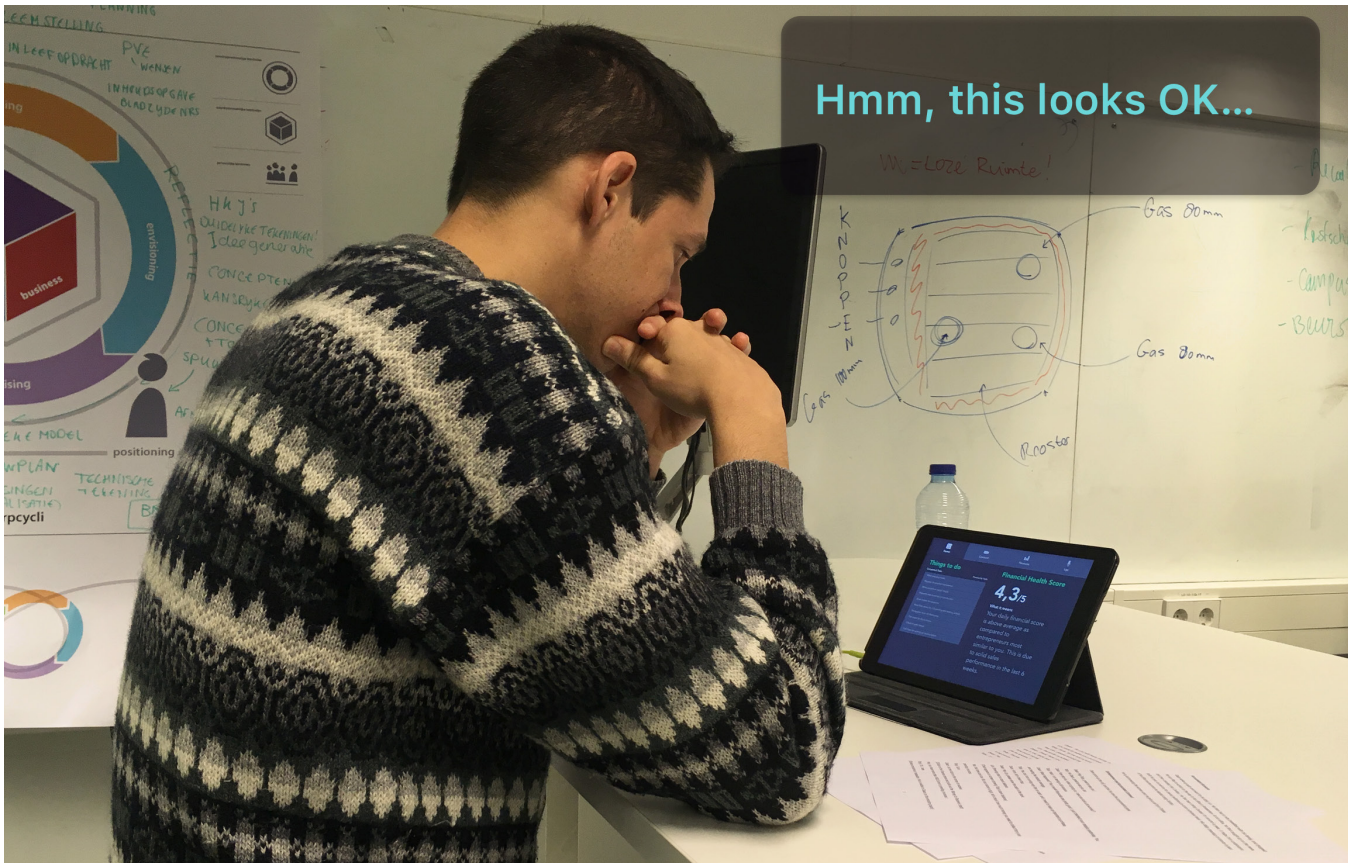
At the office, he meets his team and he checks into his Centaur system at the desk (**Picture 16**). He just started using this system three months ago. He sees that is overall financial score is quite good, though of course there is room for improvement. He is very close to the industry average, and wants to be much better. There are pending urgent tasks on his home screen - which he knows will improve his score. He makes a mental note to complete them before the end of the day.

He takes a look at his overall finances in Centaur, and is surprised to see that cash in the bank is pretty low. He needs to make an important upgrade to one of his machines and needs the money to make the purchase. He feels panic (**Picture 17**). He cannot miss this payment. He feels an impulse to call Daan right away.

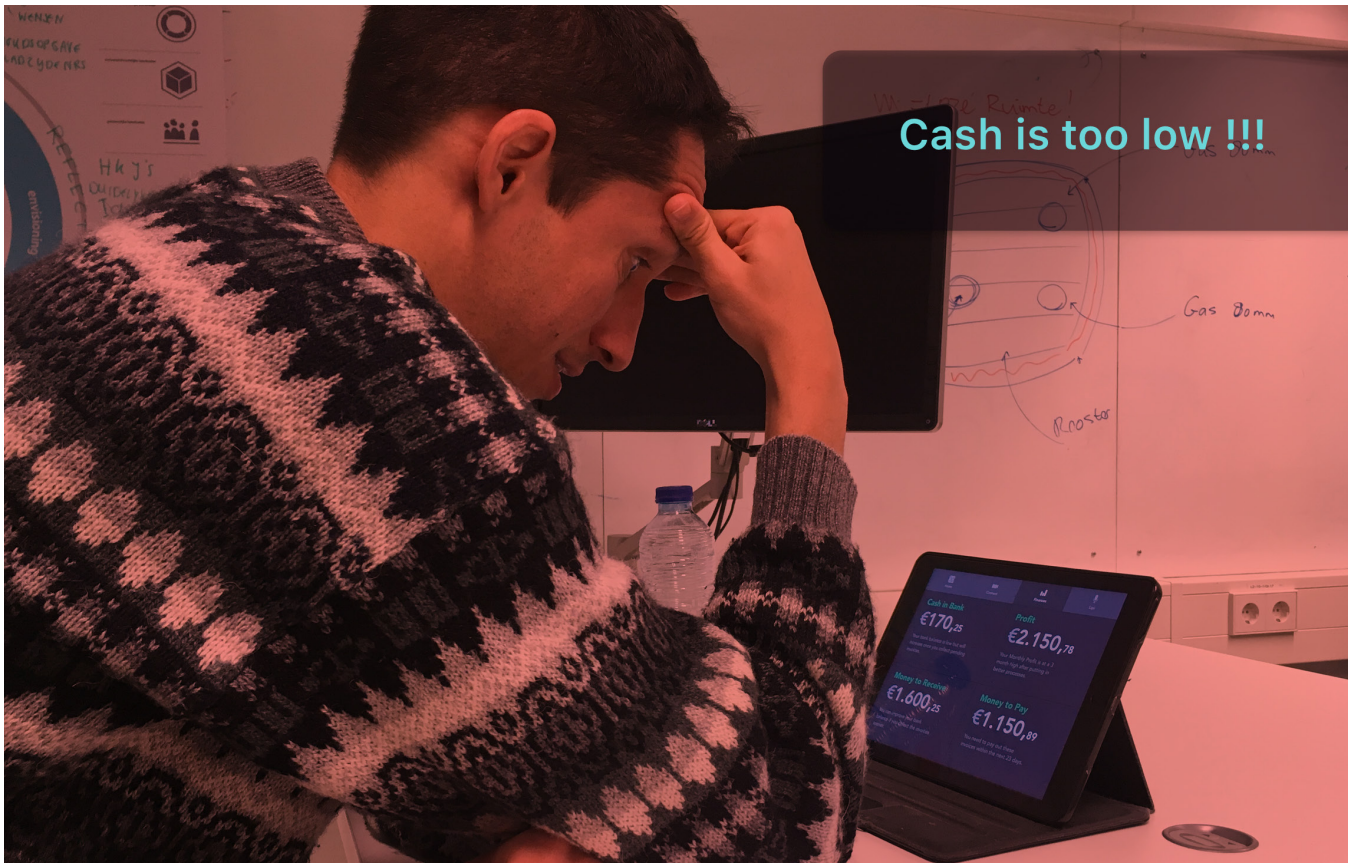
He clicks on the connect tab, where he can see the past conversations. If he had talked to Daan earlier about this problem, he might find a past conversation about it. He scrolls through the past conversations (**Picture 18**). However, there is none, so he decides to call Daan.



Picture 15. Toby checks news on the way to his office

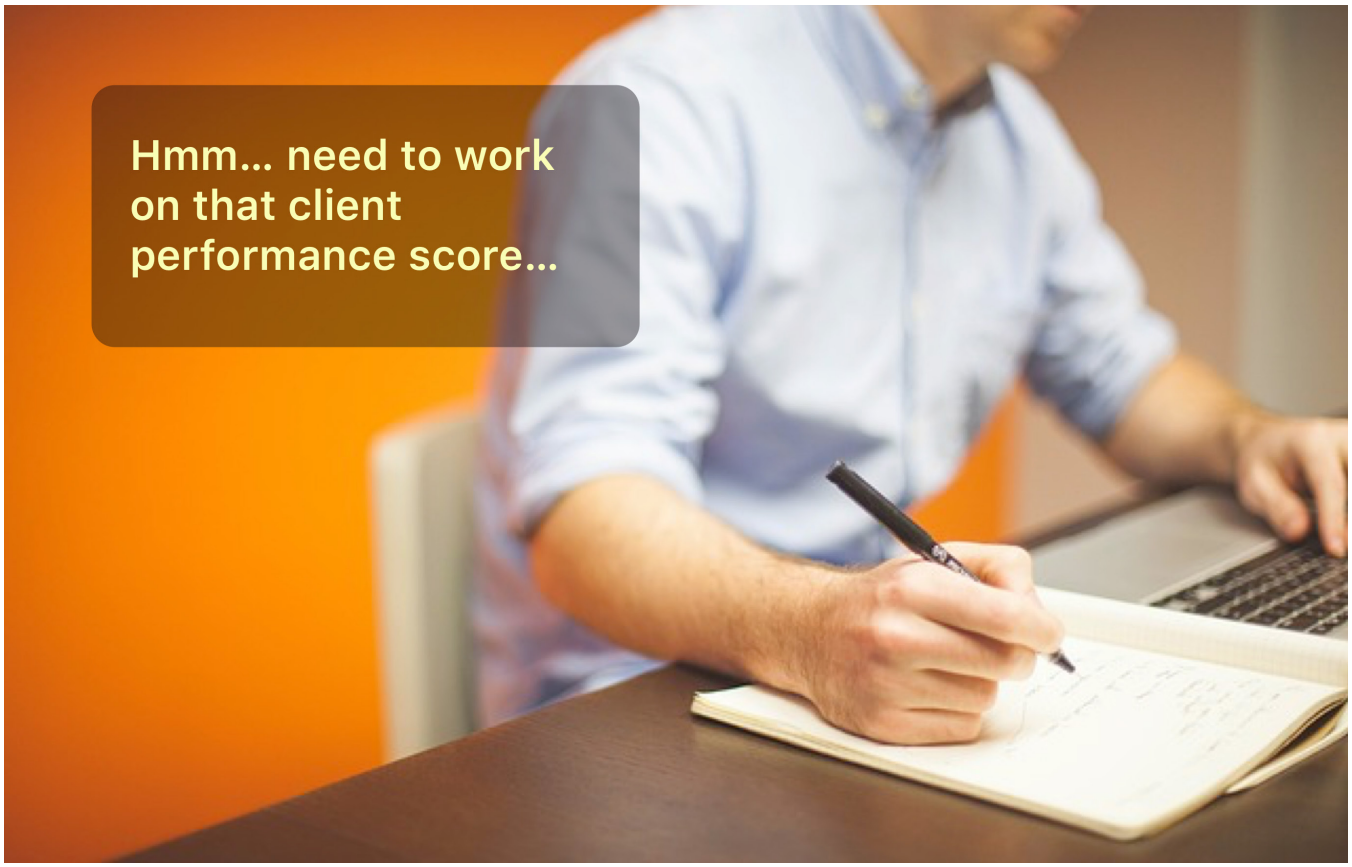


Picture 16. Toby checks his basic financials at his office



Picture 17. Toby is tense because his Bank Balance is too low.

Picture 18. Toby checks his past conversation summaries



Picture 19. Daan checks his numbers and takes notes at his office, just before Toby calls him

Accountant Scenario

Daan woke up early and went for his daily run. He then had a nice breakfast with his family, and dropped his son Max to school on the way to his office in Amsterdam. At his office, he first caught up on the news, and then checked into Centaur. He has been using Centaur for around a year, it helps him understand both his own, as well as his clients' performance at an individual level. His daily checkup of clients is part of his office routine since he started using Centaur.

He is just browsing the scores and taking some notes (**Picture 19**) when he gets a call from Tobias.

Entrepreneur and Accountant Connect

Daan picks up the call, and this his how the conversation goes:

Daan: Hey Toby, great to see you !

Toby: Hey Daan, great to see you too.

Daan: How are you, what is going on, I see you look a bit worried?

[Daan can see the emotions of Toby on a 'dynamic emotion graph' on his own screen]

Toby: Yeah, I am feeling a bit anxious.

Daan: What happened? Your overall financials are pretty good. I just checked your details yesterday. You are beating the industry average.

Toby: Yes, but I am running very low on cash, and I need to make an important purchase.

Daan: Hmm, let's check that.

Daan: **Hey Lipi**, please show the cash in the bank.

Lipi: Showing chart on bank balance.

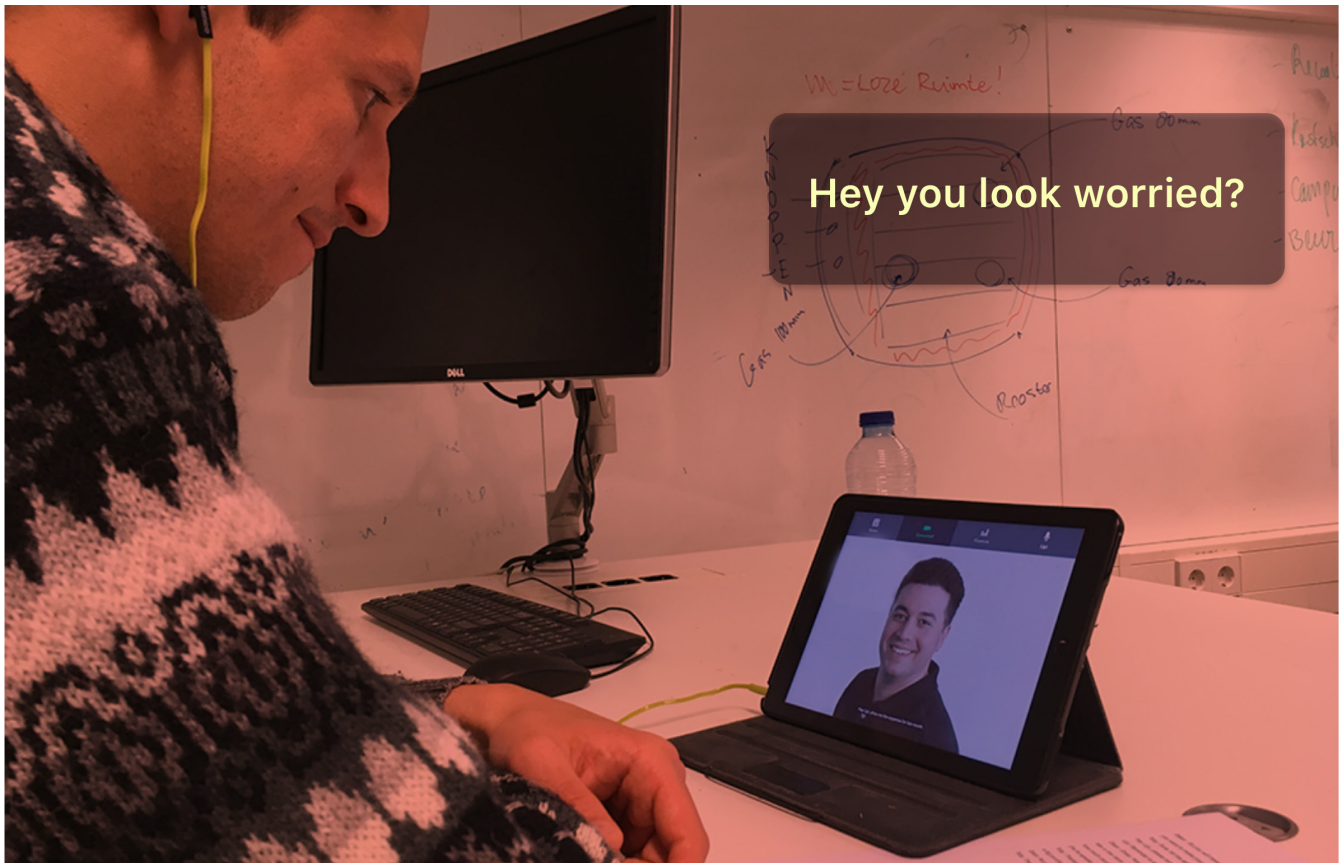
[Chart appears on screen showing Toby's bank balance]

Yes, that does look low. But your score is high, let's check how much money you need to collect from your pending invoices.

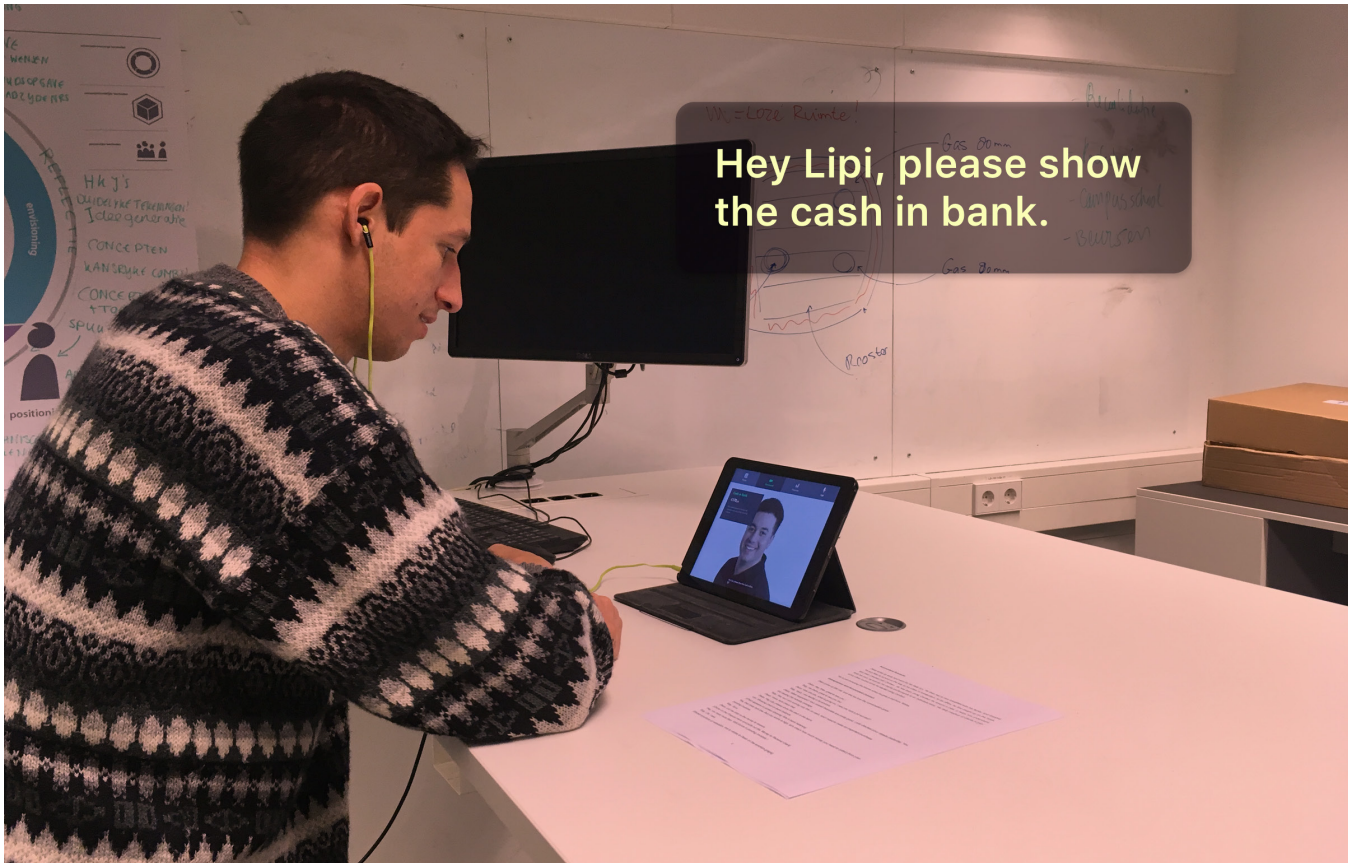
Toby: Sure.

Daan: Let me click on the money to receive.

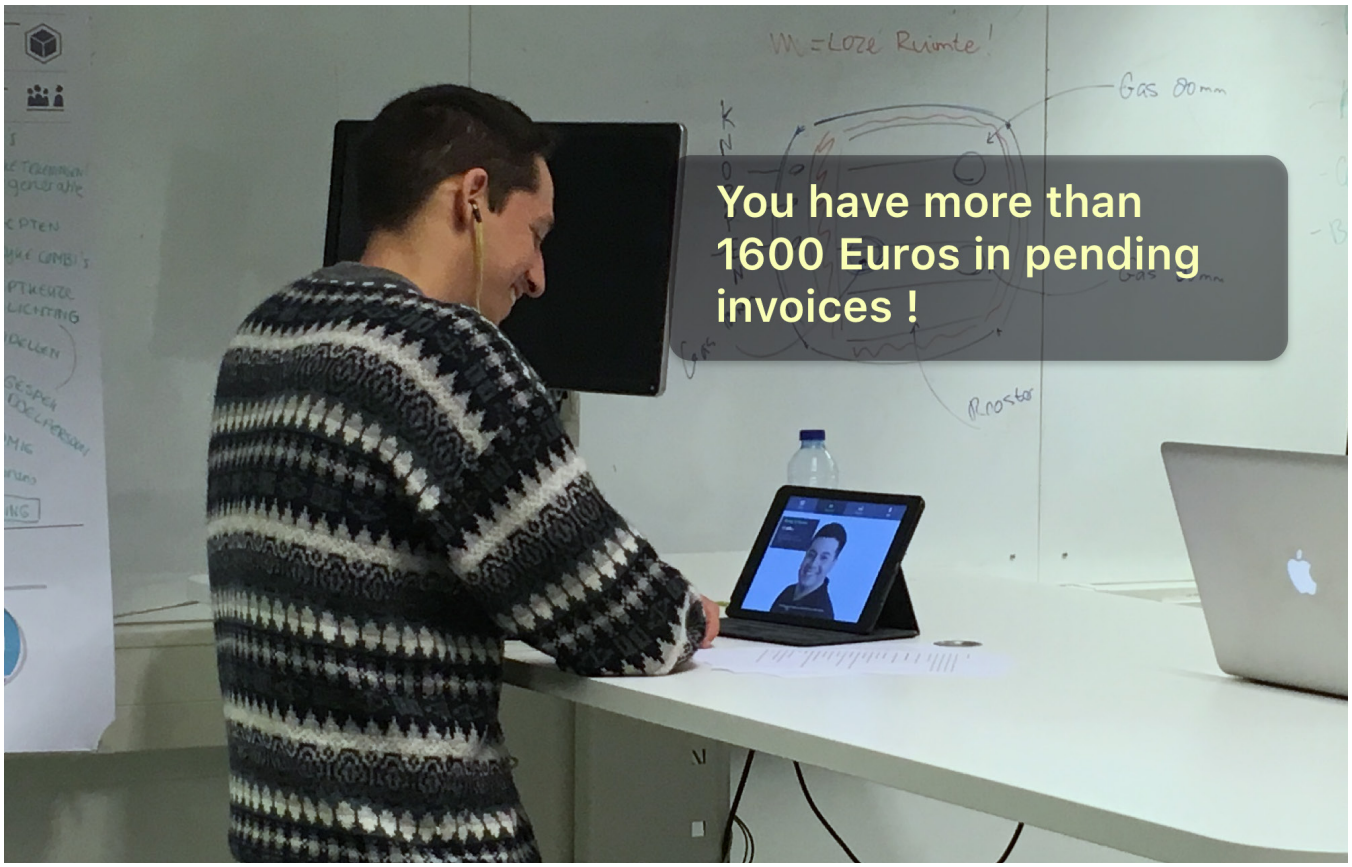
[Clicks on the Finance menu and pulls out the 'Money to



Picture 20. Toby connects to Daan, who can 'see' that Toby is worried



Picture 21. Daan asks Lipi to show the 'Cash in Bank'



Picture 22. Daan comforts Toby after checking the 'Money to Receive'

Receive' chart]

Hey, you have more than 1600 Euros in pending invoices !

Toby: Oh, I see.

[Shows emotions of relaxation, this is visible to Daan on the emotion graph]

Daan: So you will have money in the bank, as soon as you collect these invoices. Make sure you hurry if you want to make your purchase in time.

Toby: Sure, let me add a reminder for it, I will get on it.

Hey Lipi, please remind me to collect the invoices as soon as possible.

Lipi: Reminder is added.

Daan: Great. Now you do not need to worry. Just collect these on time, and don't get anxious when you see a low bank balance. Your cash flow is a better indicator of your financial health. So, always check how much money you have to give out and receive before worrying about bank balance.

[As he speaks, he can see Toby becoming calmer and relaxed in the dynamic emotion graph]

Toby: Thanks Daan, that helps. I was just worried because I have never been so low on cash, and I have a big purchase coming up.

Daan: No problem. Have a good day !

Toby: Thanks. You too !

[After end of conversation, this conversation is transcribed and summarized in the product. So, the next time Toby has the same doubt, he can look it up in his past conversations and find it. This will save him time as well as save Daan's time, thus saving costs for Toby.]

Note:
Scenarios were sketched out using drawings (shown in **Appendix A10**), but here they have been presented with pictures to make the presentation clearer, and showcase the product in context.

Product Ideation Process

Based on the foundations performed in previous sections, few basic ideations were carried out from sketching to wireframes. This went through four stages as shown in **Figure 34**:

Ideation Sketches: I started ideations while listening to customer interviews for transcription. Listening to the voices of the customers already gave some concrete directions for the concept. Also, while building a new screen or feature, I always sketched it to get a clear idea of the broad picture and only then refined the design. Based on reflections on ideations as well as developing clear scenarios, I developed wireframes.

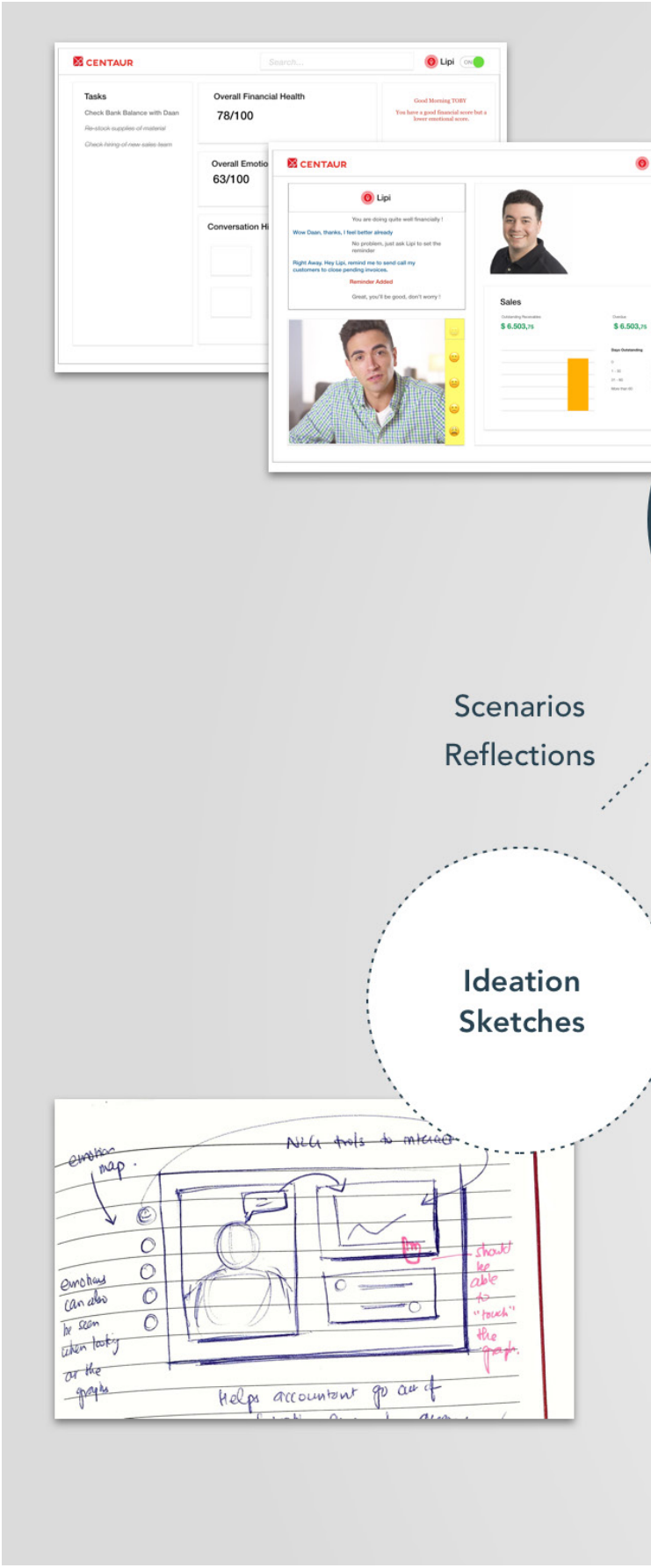
Wireframes: These were made in Apple Keynote software to give a clearer picture of how the flow would look like in the product. I tried to translate the scenario into a product. I received expert feedback as well as reflected more on the flow.

Hi-Fidelity Designs: This is where I developed the complete flow in high resolution with complete functionality. I attempted to capture the product vision and qualities at this level. There were multiple iterations at this level. From an initial colorful design, I decided on a more darker interface to express the quality of 'intelligence'.

Final Design: This was made when the hi-fidelity designs were shared with users - both entrepreneurs and accountants. Detailed interviews were conducted with 2 entrepreneurs and 1 accountant to get their perspective. The interviews asked three questions - 'What I like..', 'What I wish..' and 'What if?'. This helped in underscoring the strong points of the design as well as pointing out the areas for improvement. I also talked to 2 design professionals (from my personal network) for a sharper critique on the UI design - this improved the final design significantly.

The final design is explained in the next section.

The process had multiple rounds of iteration, reflection, and feedback.



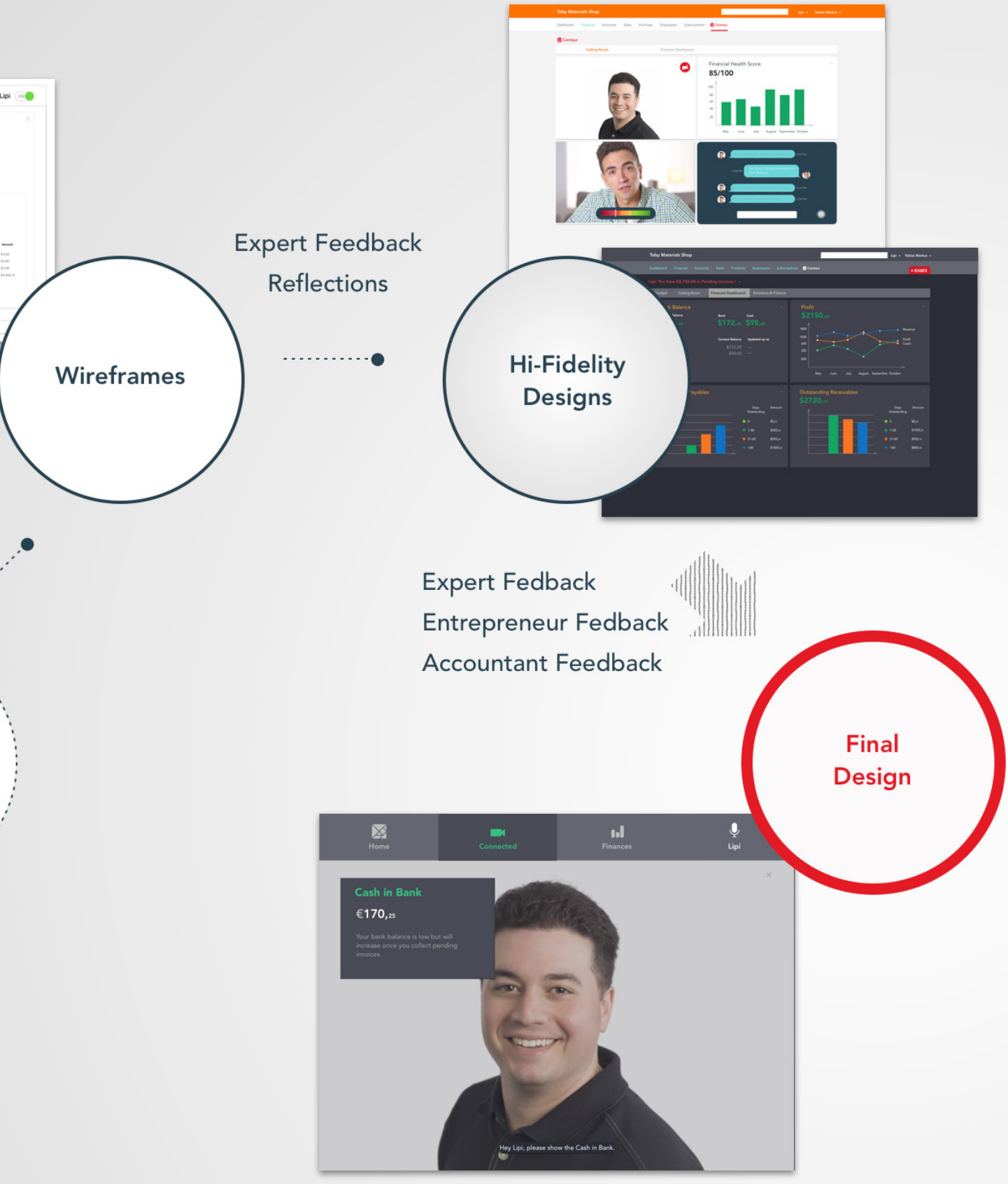


Figure 34. Product Ideation Process

Final Concept Design

The concept is called Exact Centaur. It has 3 key components:

1. **Interface**: This is seen by the user. It has a graphical component, as well as a voice component. The voice-assistant is called 'Lipi' and can be called by using the 'Hey Lipi' command.
2. **Data**: Data has two primary sources. One, the conversations between entrepreneurs and accountants are stored and summarized. This is related to the 'Information Goldmine' cluster of the future context. The other source is financial data which is already provided by Exact. Finally, other external sources of data can be task-management tools like Trello. All data is stored on the secure Centaur Cloud.
3. **Algorithms**: These are the intelligence of the system, and do the operations which provide the output to the interface. For example, the algorithms process financial data to create 'Urgent Tasks' - which are the actions the entrepreneur needs to take to improve her financial score.

The relations between these components are shown in **Figure 35**.

To understand the interface, we take a look at the architecture diagrams, starting with the Entrepreneur architecture diagram (**Figure 36**). A complete description with interactions is also available on YouTube (https://www.youtube.com/watch?v=2vxAGtKAF_U). There are four key tabs - Home, Connect, Finances and Lipi.

The Entrepreneur 'Home' Tab

The Home tab shows the task list as well as overall financial score. The task list further has 2 sections - urgent notifications, and other tasks. The urgent notifications are generated by Centaur to help entrepreneur perform the right tasks to improve his financial score. The 'Other Tasks' are powered by external widgets (in this case, Trello, which is a popular task management software).

The other part of the home tab is the 'Financial Health Score'. This is an overall score which is calculated by Centaur based on the financial performance of the entrepreneur, and compared with the industry average. This gives the entrepreneur a clear understanding of her performance, and adds to a sense of control. Based on this score, entrepreneur can prioritize next actions. Just below the score, there is a simple explanation of why the given score was achieved.

Both 'Urgent Tasks' as well as the text underneath the 'Financial Health Score' are 'Smart insights' - these are human readable suggestions and explanations of the number which is visible on the screen. **Across the interface, every number is accompanied by a smart insight which explains it.**

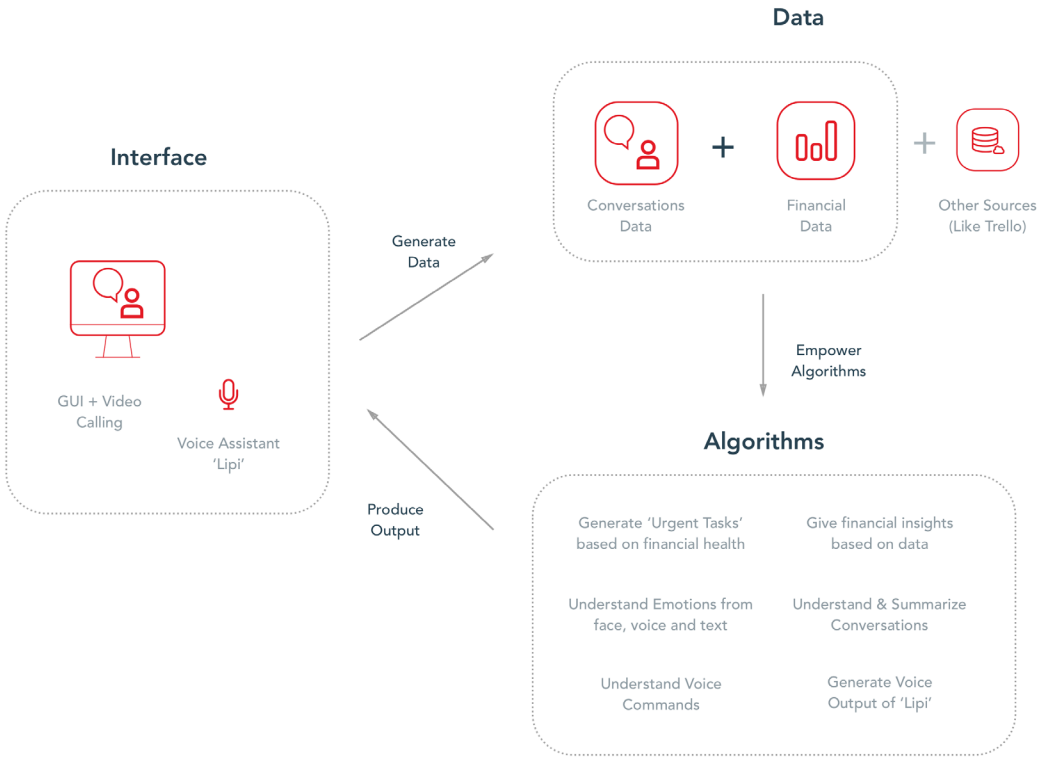


Figure 35. Interface, Data and Algorithms - Overall structure of Centaur

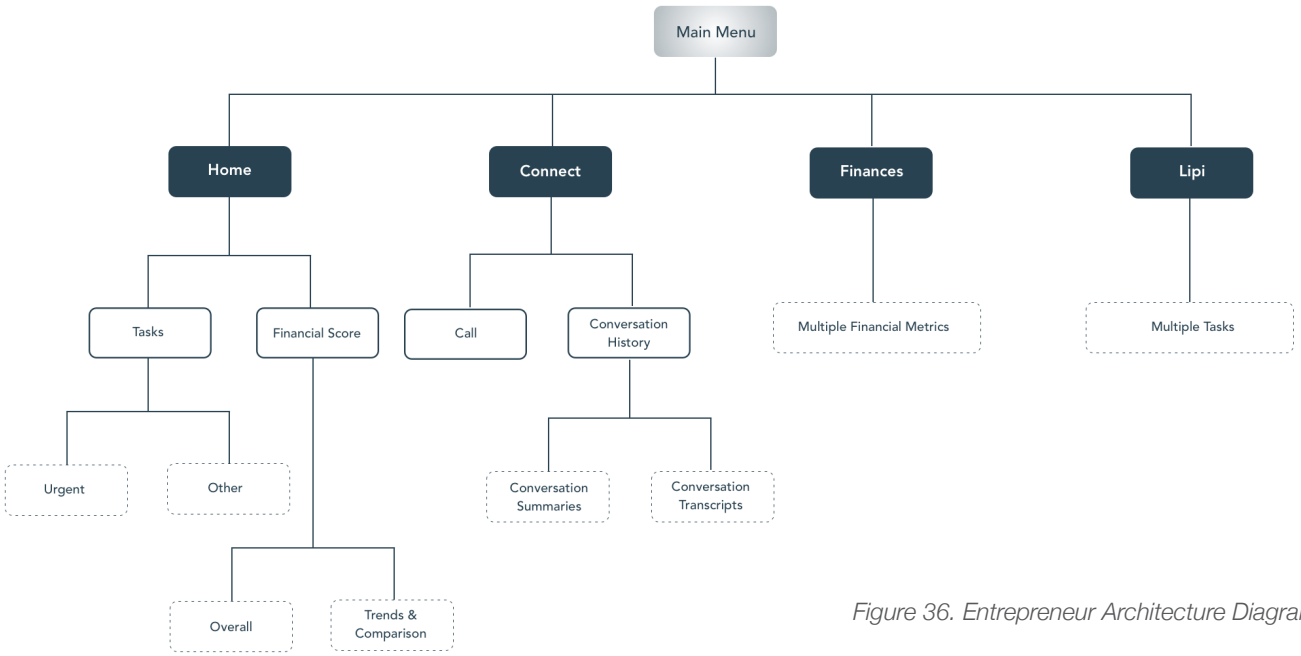
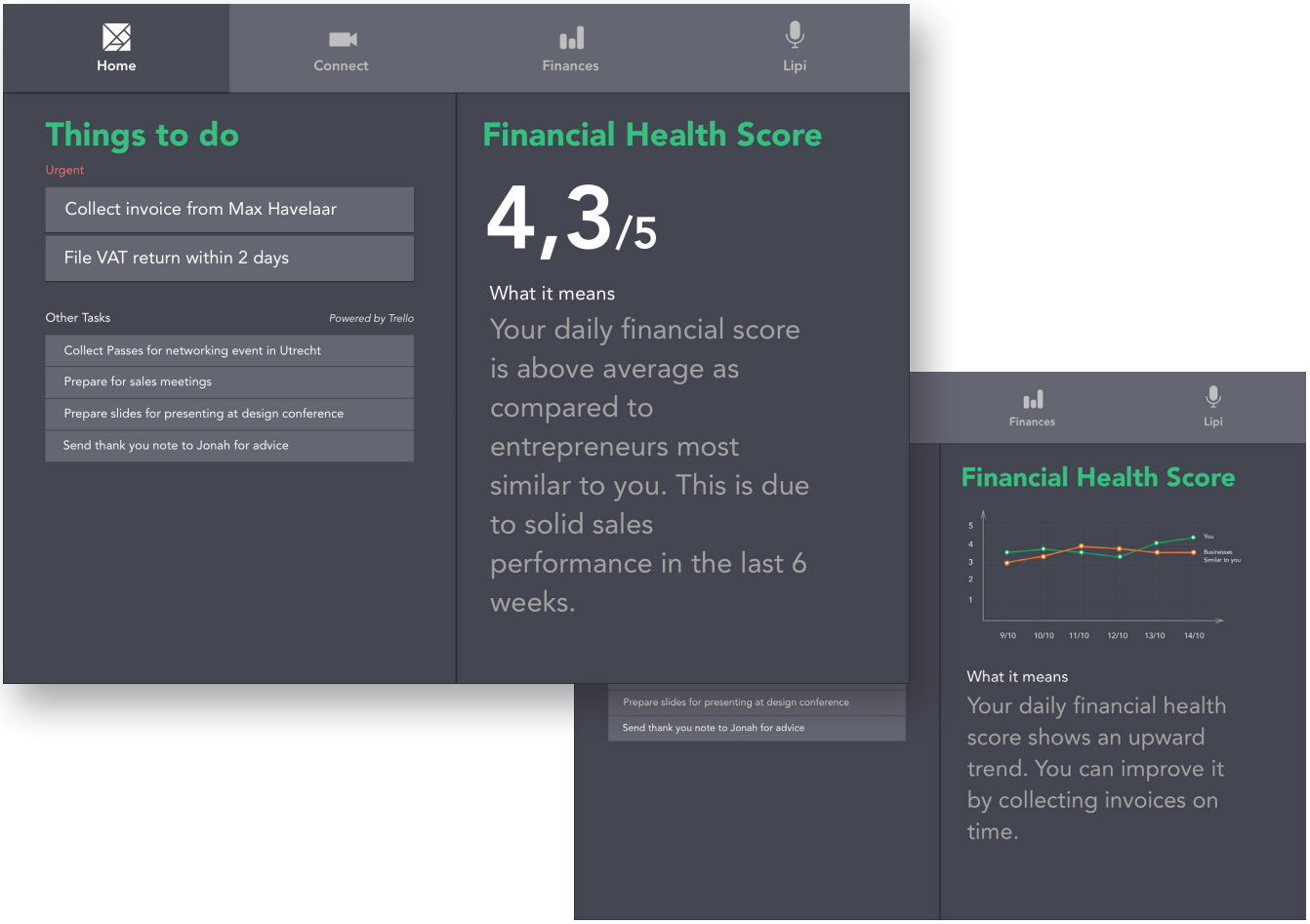


Figure 36. Entrepreneur Architecture Diagram



Picture 23. On tapping the 'Financial Health Score' on Home tab, it 'flips' to show comparison with scores in the same industry

The Entrepreneur 'Connect' Tab

Next to the Home Tab, there is the 'Connect' tab - shown in **Picture 24**. This is the core of the concept. The cluster of 'Information Goldmine' mentioned in **Chapter 5** comes into action here.

Calling the Accountant

Here the text is 'Connect with Daan'. The actual accountant name is used to make sure the software has a personal and natural feel. This underscores their connection. There are three buttons which are named according to the way they can be used to communicate.

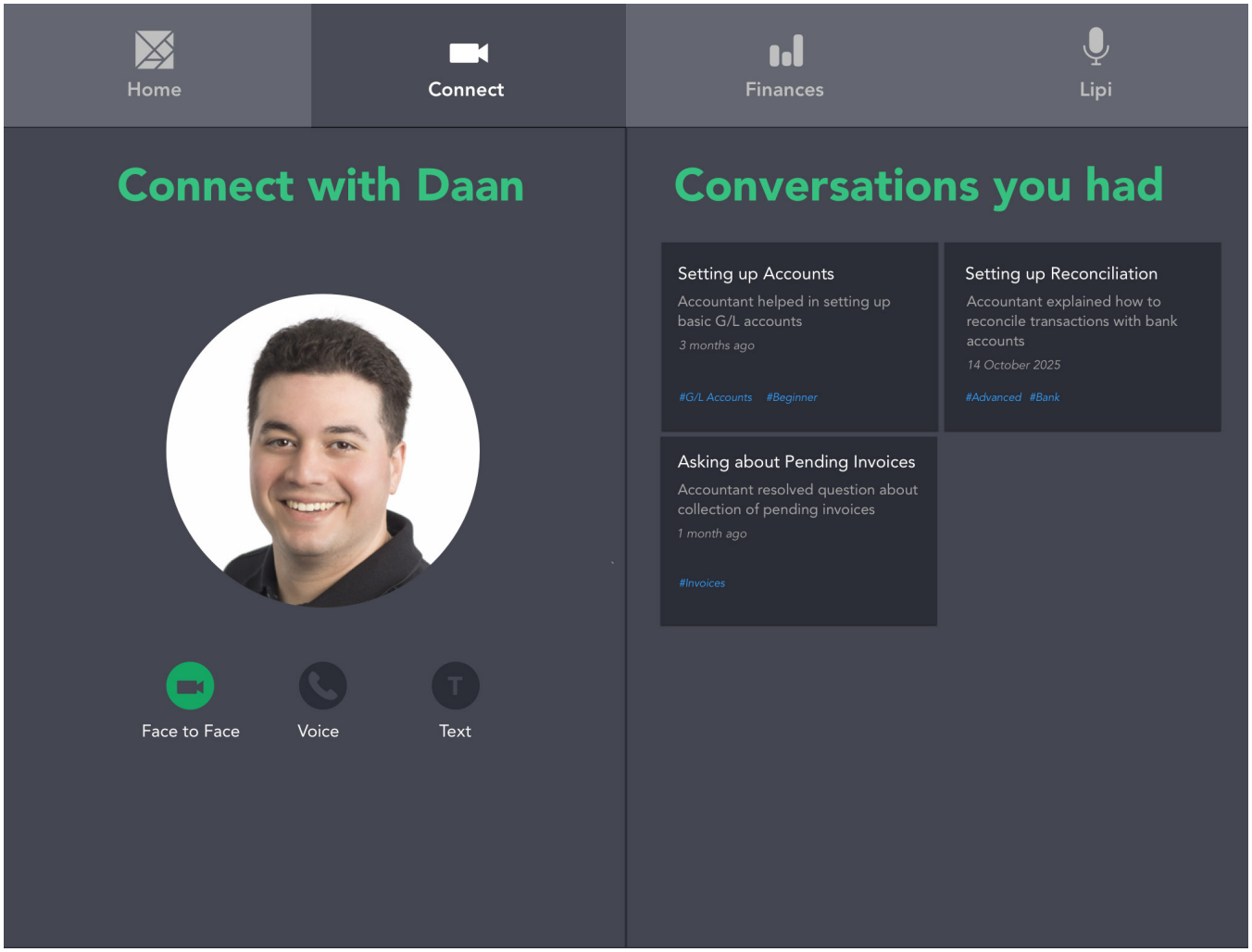
'Face to Face' - This is used for video calling. This button is highlighted in green color because the user is nudged to call face to face.
'Voice' - This is for audio calling.
'Text' - This is included because there may be cases where the entrepreneur is in a public space and does not want to speak. Hence, he can type the text.

The details of calling are covered later, after looking at all the tabs, as it makes use of multiple features.

Looking at past conversations

This is the section with the title 'Conversations you had'. It displays a set of past conversation summaries with a heading and hashtags - all of these are automatically created after every conversation between the entrepreneur and accountant. This is included to let the entrepreneur access and learn from his past conversations. This is shown in **Picture 25**.

The summaries also remove the identification information from the conversation. This means that they can now be shared across accountants and entrepreneurs. Once a conversation is finished, the summary is uploaded to the Centaur Cloud. And from here, it can be accessed by every entrepreneur through 'Lipi' the voice assistant (**Figure 37**). This makes the system exponentially smarter. This is derived from research (**Section 4.5**) which says that more and more businesses are creating



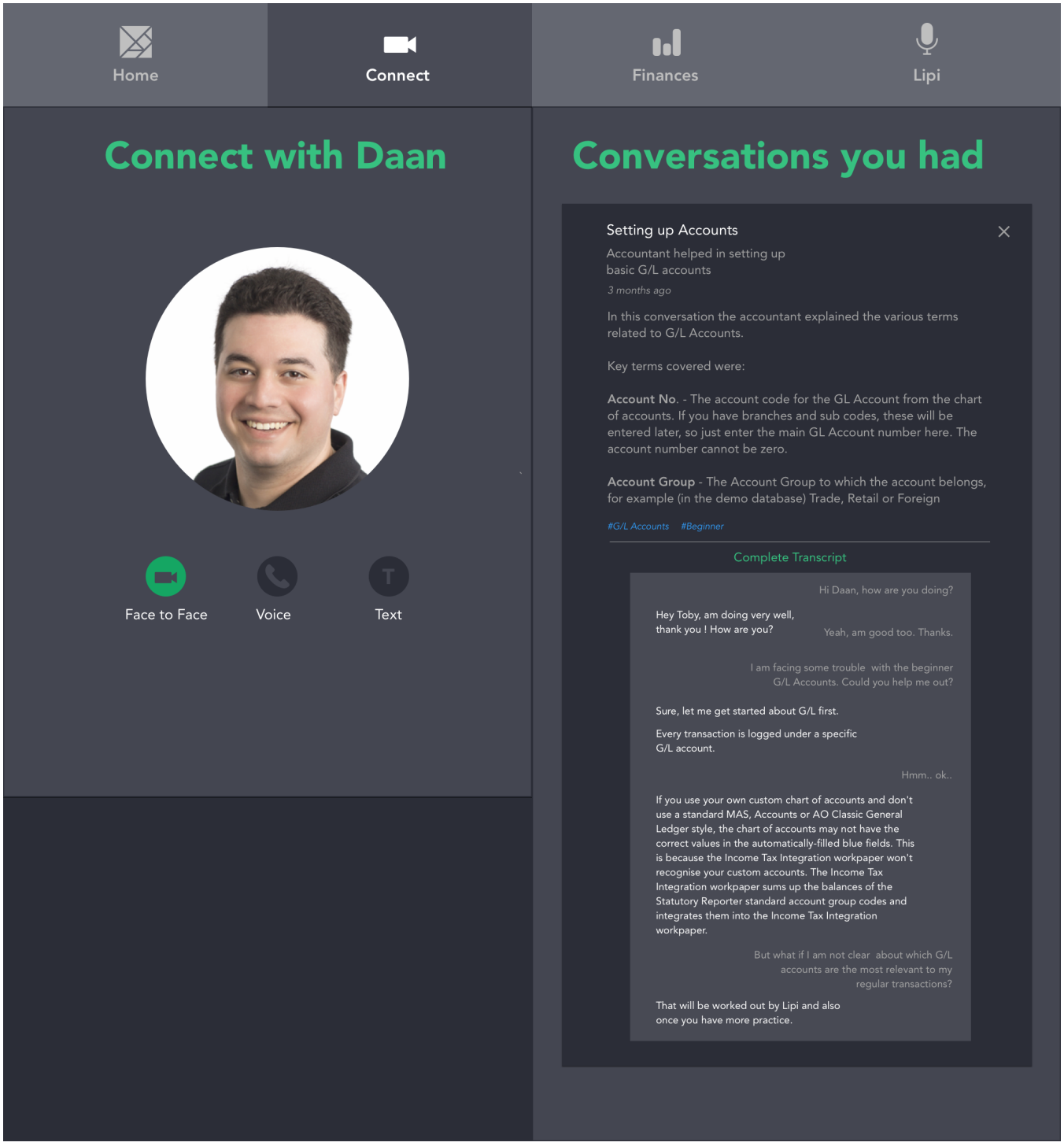
Picture 24. The Entrepreneur 'Connect' Tab

value through networks.

This also makes sure that entrepreneurs do not ask the same questions to the accountant again and again. And hence, the accountant can focus on new questions which require complex human expertise.

This feature also clearly differentiates Centaur from the other video calling tools (like Skype and Google Hangouts) in the market. None of the current tools let the users look into past conversations or search them. The information in conversations is lost. In the future, tools should be available not just to capture this information, but also to synthesize it in form of summaries.

If the entrepreneur wants to see the complete transcript, he can access it by clicking on the card. This data is private for the entrepreneur.



Picture 25. The Entrepreneur 'Connect' Tab with summary and details of past conversations

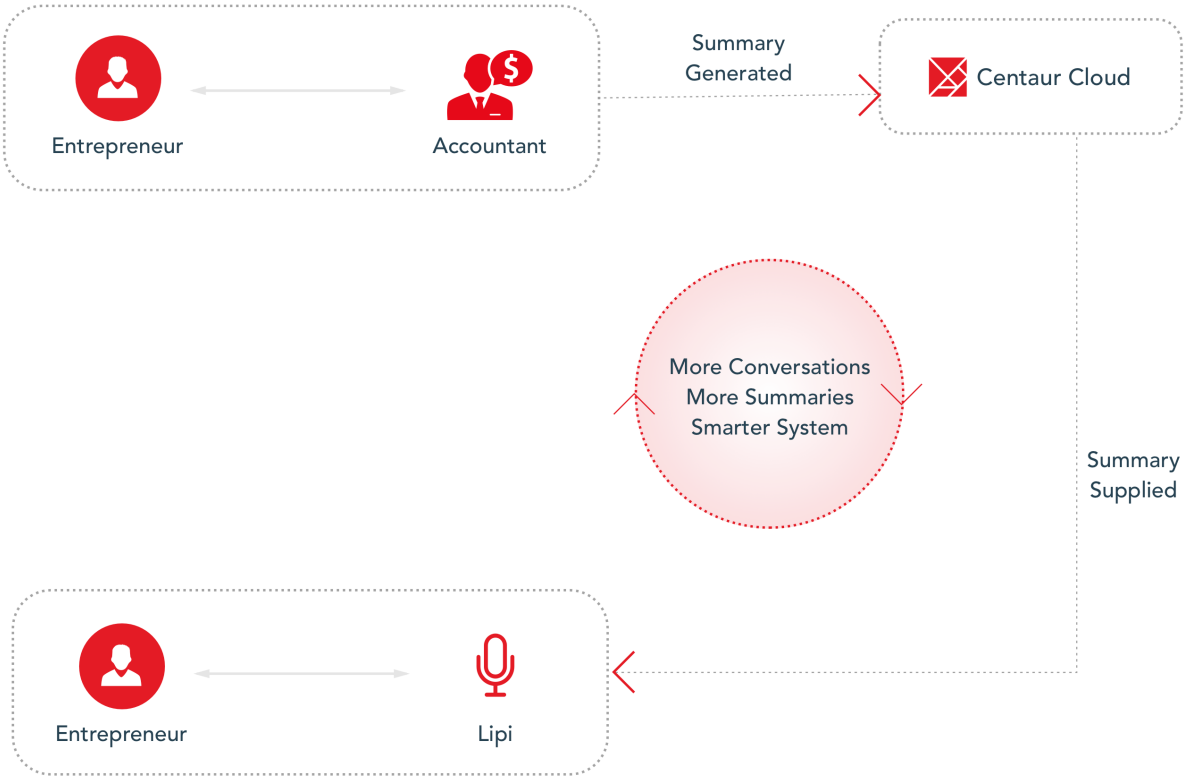


Figure 37. Centaur becomes smarter with each conversation in the network

Here the design principle of Progressive Disclosure has been used. The user is shown the transcript only when he or she needs it. This makes the interface simpler to navigate for first time users.

The Entrepreneur 'Finances' Tab

In this tab, the entrepreneur can clearly see the big numbers which constitute financial performance. Each card has a simple title. For example, the accounting term 'Accounts Receivable' is replaced by 'Money to Receive'. The numbers are shown in very large font size to ensure that they 'jump out'.

Below every figure, there is a one sentence tip generated by Centaur. This tip is based on the financial performance and is presented in a simple language.

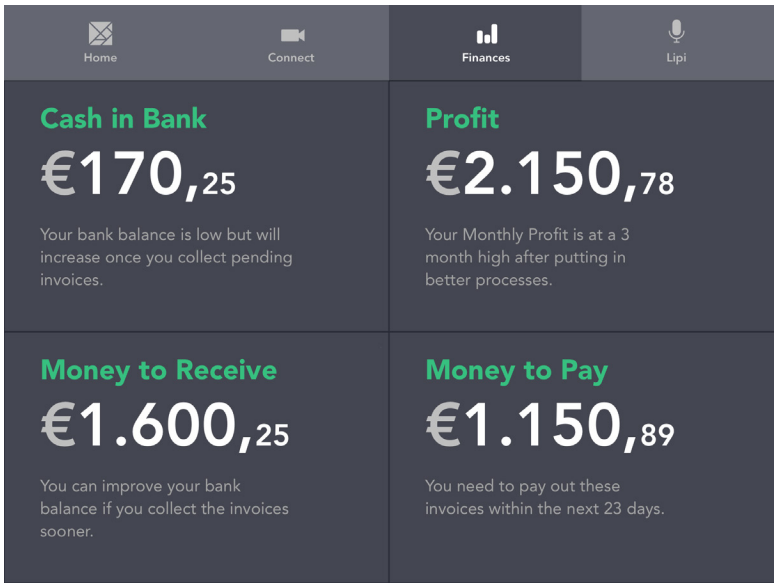
Here also the principle of Progressive Disclosure is applied. If the user wants to see the details of the financial parameter, she can 'flip' the card by tapping it. This inverts the card and displays the details for that parameter.

For example, flipping the 'Profit' card can show trends in profit as well as revenues and costs. This is useful when entrepreneur wants to study her finances in detail, or when she wants to discuss the details with the accountant. All the cards can be flipped to reveal details. These interactions are shown in **Picture 26, Picture 27**, and **Picture 28**.

The Entrepreneur 'Lipi' Tab

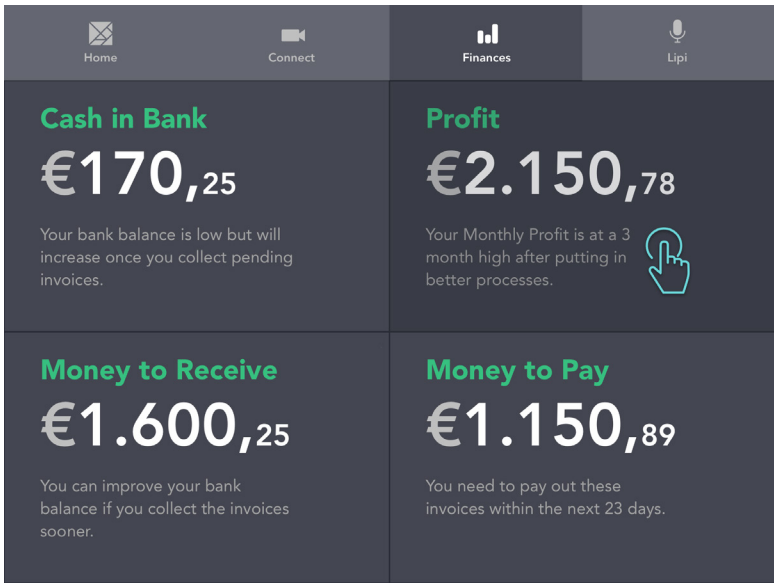
This is the interface to connect with the Voice based digital assistant. Having a voice based UI leads to much smoother and simpler interactions. Having a voice assistant removes the need for complicated menus. 'Lipi' stands for Language Interpretation and Processing Interface (LIPI). Lipi can be called by using the 'Hey Lipi' phrase. More details about the name are given in **Section 6.5**.

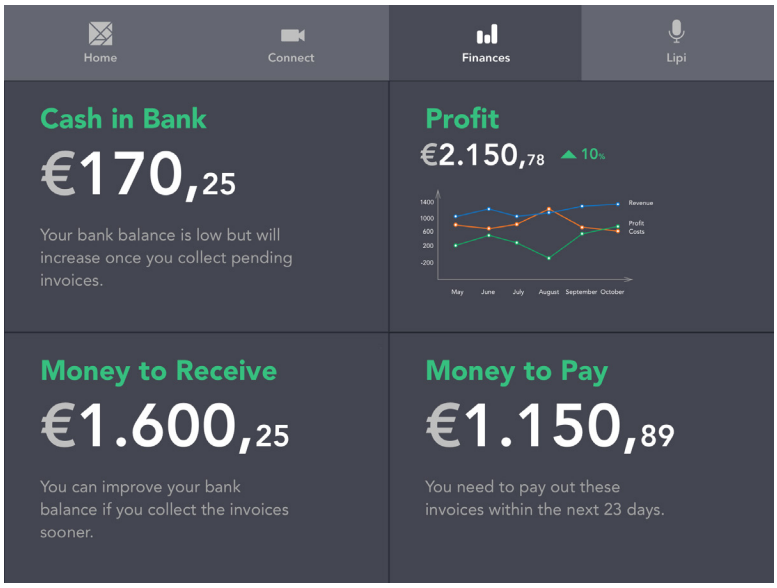
The interaction is shown in **Picture 29**, where we can see Lipi in action. Lipi can take voice input, and provide the output in many ways - from voice and text to graphics - whichever is most suitable for a given query. Lipi also tells about past conversations with accountants by providing the summary when asked using voice commands. In this way, entrepreneur does not need to scan summaries manually if she is in a hurry - she can just ask Lipi and save her time.



Picture 26. The Entrepreneur 'Finances' Tab - it shows basic figures with a small natural language description of the figures. The numbers are big and bold so that they can be perceived quickly - to save the time of entrepreneur

Picture 27. The Entrepreneur 'Finances' Tab - on tapping a card with a financial figure, the card 'flips', giving a playful and smooth feeling.





Picture 28. The Entrepreneur 'Finances' Tab - after the flip, the card shows more details about the financial figure. For example, in this case, Profit trends are shown along with revenue and cost trends. The card can be flipped back.

Making the Connection

When a call is made, we see the screen as shown below.

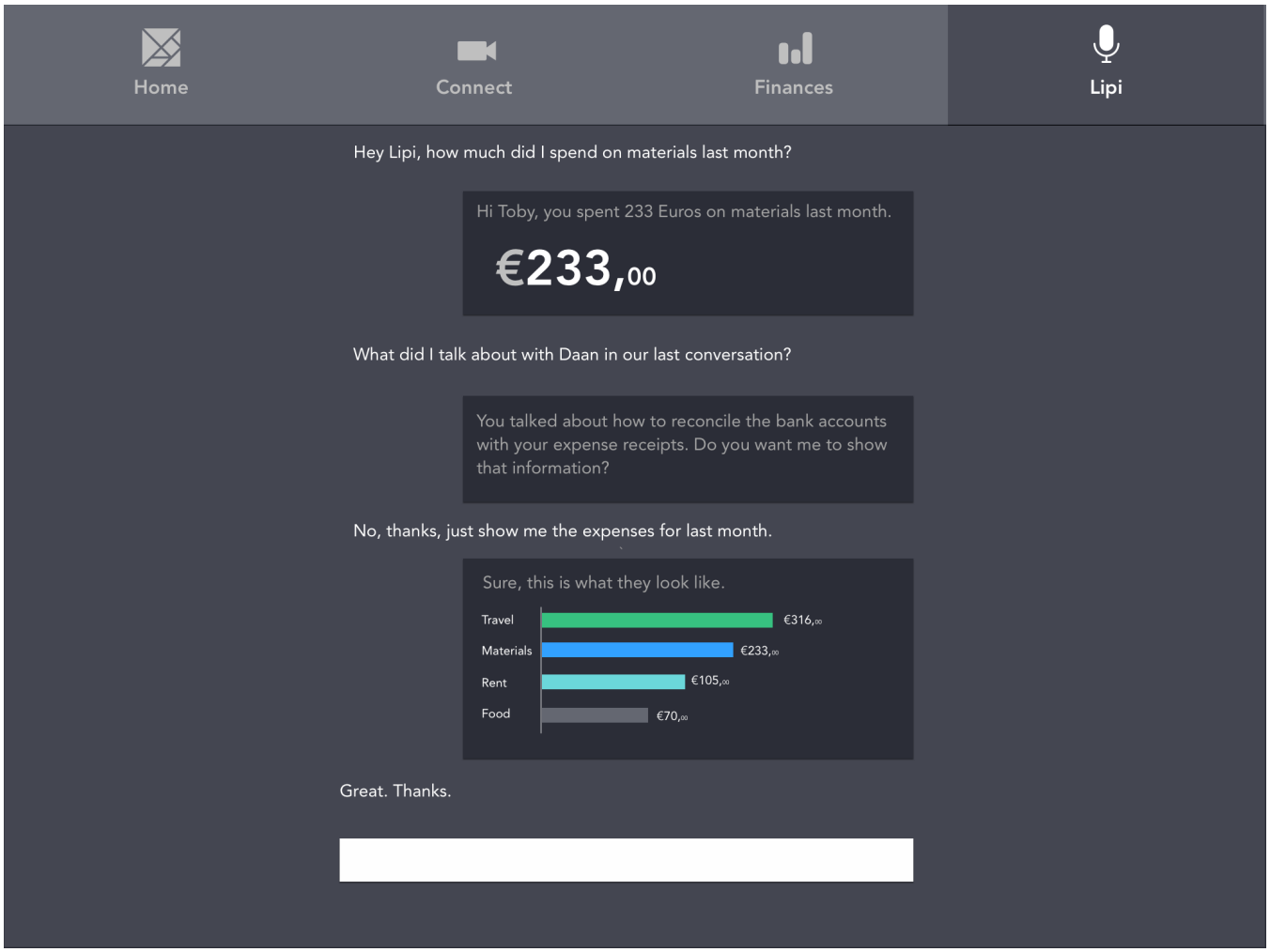
This changes the Menu bar, as the 'Connect' icon is now changed to 'Connected'. At the same time, the 'Lipi' tab is also activated. This is to highlight that voice commands can still be used during a conversation between two people. For example, if any of the users want to know the bank balance, they can just ask Lipi to show it on the screen.

Apart from calling Lipi, the interface can also be used normally during the conversation. For example, if the users want to see the Finances, they can just click on the finances tab, while they are having the conversation.

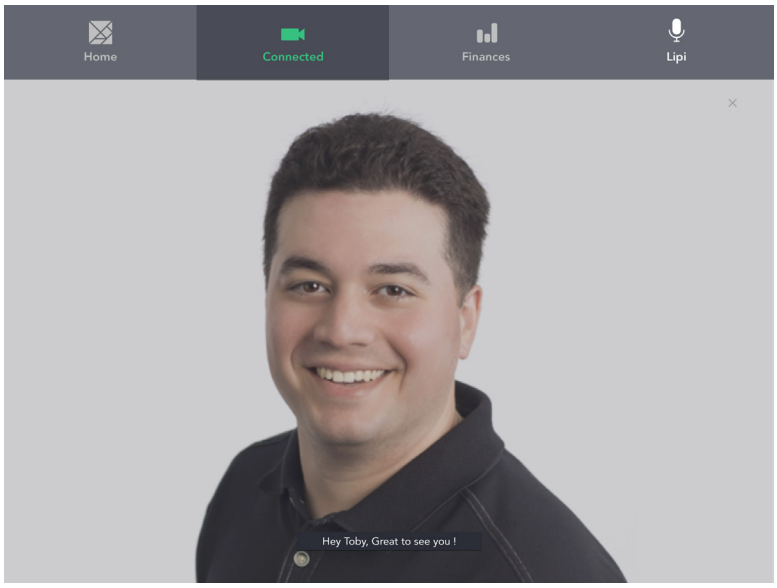
The relevant chart can just be tapped to bring it within the conversation. And after tapping, it appears in the conversation, right on the screen.

This is to make the interaction of discussing figures much smoother. With current tools, entrepreneurs and accountants have to change windows and it is difficult to be sure what each person is talking about. This chart-on-screen ensures that they are literally on the same page. This should lead to a more rich and fluid experience.

To remove the chart after it is used, it can simply be swiped-up. This returns the screen to normal, full-face view. **Pictures 30 to 35** show this interaction.

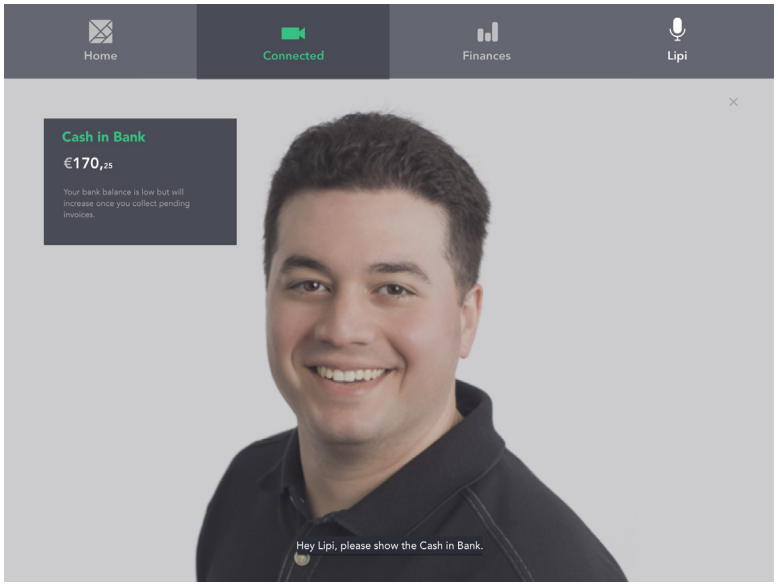


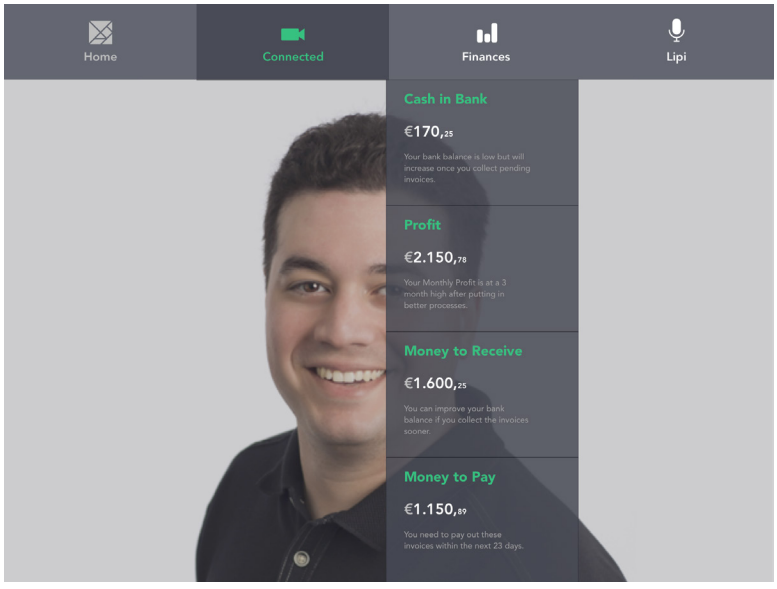
Picture 29. Lipi in action - showing past summaries, as well as handling simple and complex queries



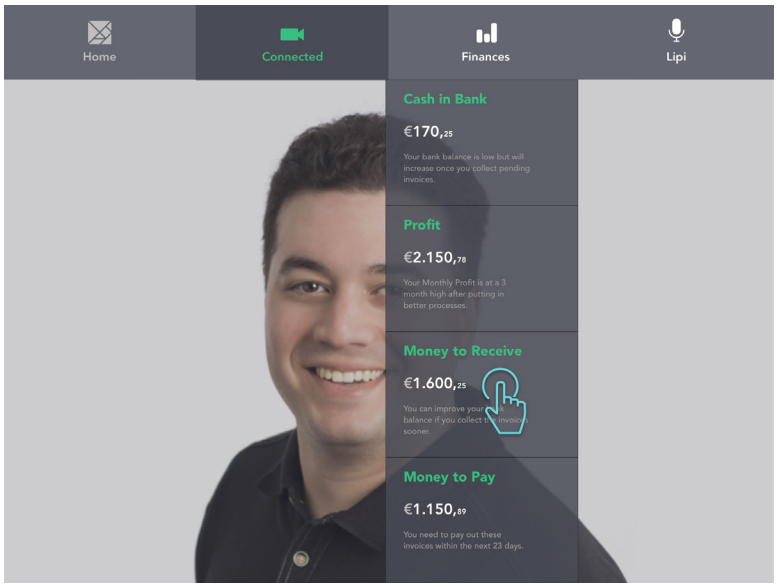
Picture 30. The Entrepreneur 'Connect' Tab - it changes to 'Connected' to show active status and the 'Lipi' icon is also bright - to show that Lipi can listen to the conversation and respond to commands.

Picture 31. The Entrepreneur 'Connected' Tab - When the user asks for a financial figure, he can just ask Lipi to show it, and it appears on the screen.



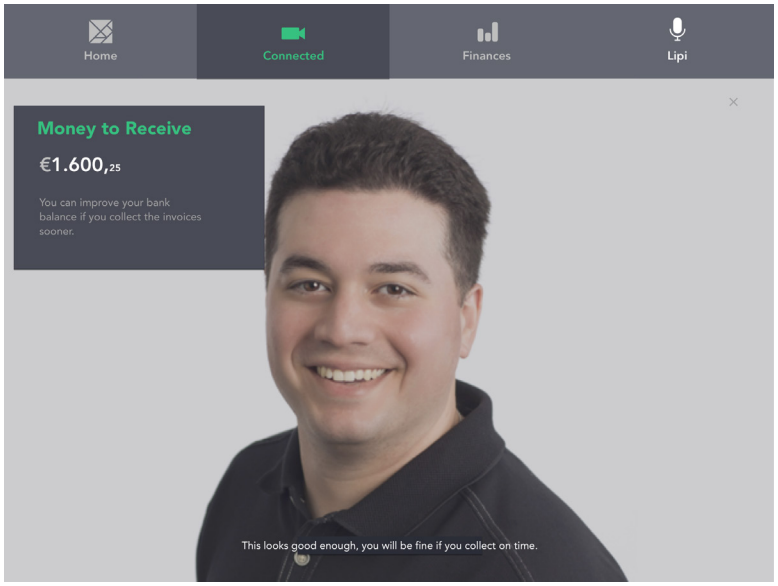


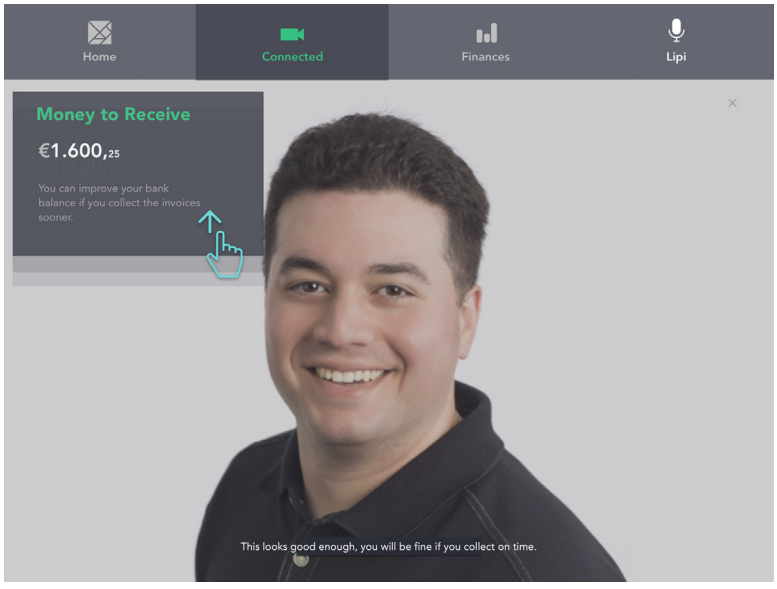
Picture 32. The Entrepreneur 'Connected' Tab - users can also click on other tabs like 'Finances' and navigate them within the calling interface itself.



Picture 33. The Entrepreneur 'Connect' Tab - the user can tap the card they want to see in the conversation, the chart is visible to both the parties on the call.

Picture 34. The Entrepreneur 'Connect' Tab - After tapping, the card appears on the screen. It can be touched and dragged on the screen





Picture 35. The Entrepreneur 'Connect' Tab - after the card is no longer needed, it can be 'swiped-up' to remove it, and return the screen to a normal full-face view.

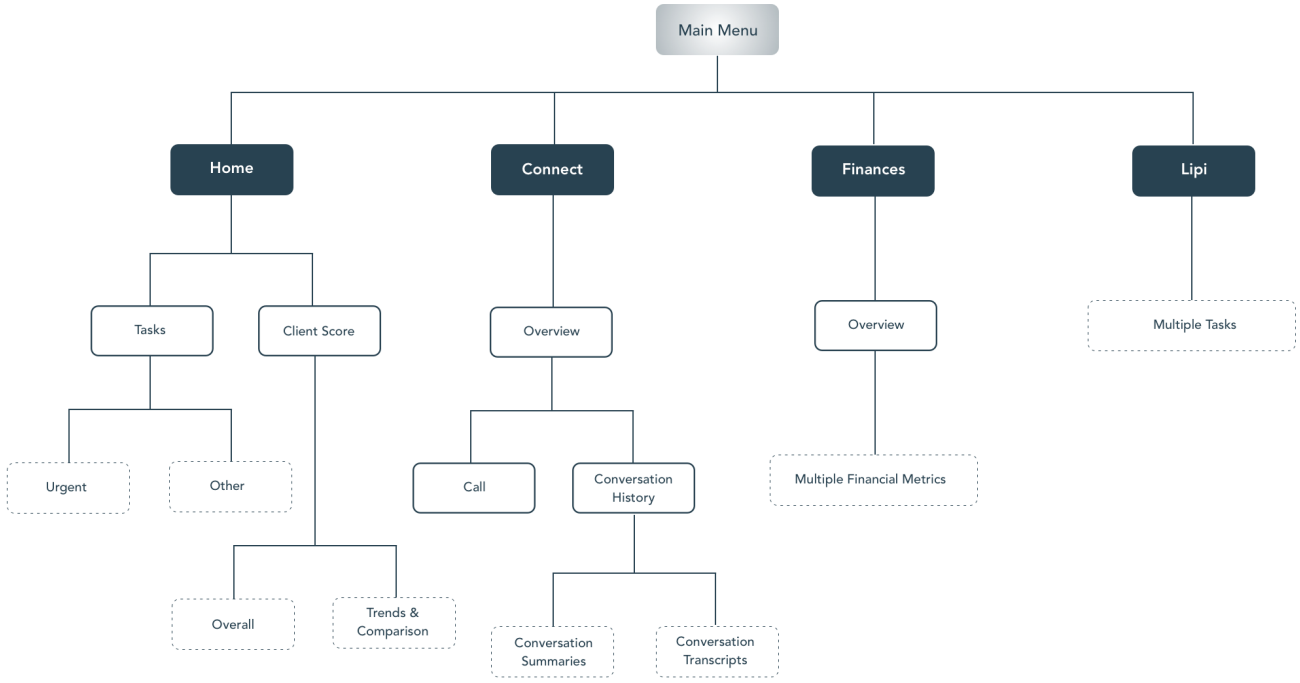


Figure 39. Accountant Architecture Diagram

We now look at the accountant's interface. The overall architecture is the same, in terms of the four tabs - Home, Connect, Finances and Lipi.

However, at the second level, the Connect tab and the Finances tab are slightly different. Also, the Home tab shows slightly different information.

The Accountant 'Home' Tab

Here, the notifications and task list work exactly the same as they do for entrepreneur. However, instead of a financial score, the accountant gets a client performance score, which is reflection of the scores of all his clients, compared with accountants who have similar clients. This is shown in **Picture 36**.

The Accountant 'Connect' Tab

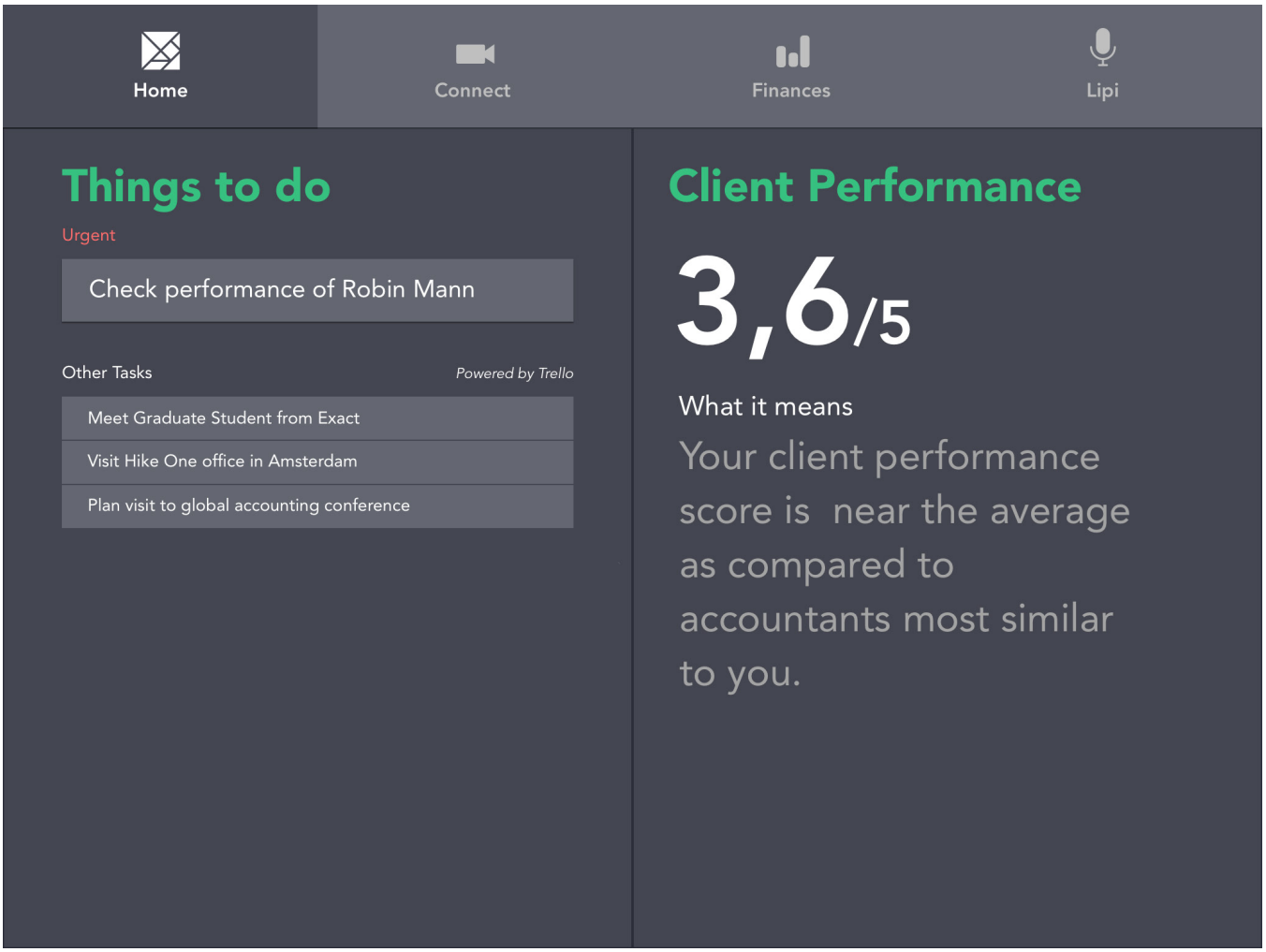
In this tab (**Picture 37**), the accountant can see all the clients in one view. The individual financial scores as well as the basic reason for that score are visible to the accountant. This can help the accountant pinpoint and prioritize which client to call first.

On tapping the name of the entrepreneur, the accountant sees the screen similar to the entrepreneur, where he or she can call the entrepreneur and also view the past conversations.

However, when the accountant calls the entrepreneur, the interaction is slightly different. Apart from the same functions for charts, the accountant also sees dynamic emotion graphs. These graphs show emotions of both the entrepreneur and the accountant. The emotion typology is - anger, contempt, disgust, fear, happiness, neutral, sadness, and surprise. These emotions are communicated universally and across cultures. The emotions are captured from the face, tone of voice as well as the actual words spoken of the speaker. Hence, this also works on an audio call or when they use Text to communicate.

The entrepreneur emotions are included so that accountant can gauge what the entrepreneur is feeling in real-time. This is where the interaction is similar to in-person meeting. Most accountants want to see the clients because they want to infer clues from their facial expressions and from their voice, these graphs help in objectively capturing that information. They can help further in case the accountant is distracted or tired. If the accountant feels confident in emotion assessment, they can minimize the chart. This feature derives from the cluster 'Accountants are like mothers' - where the mother not only wants to know what the child is thinking, but also what the child is feeling.

Based on feedback from an accountant, the accountant's own emotions were also included in the interface. This was because sometimes accountants might get into arguments and get confrontational with the entrepreneur. Though they may be right in the argument, this might harm the relationship. Such a graph would help them become more self-aware of their own emotions, and hence become more calm if they can



Picture 36. The Accountant 'Home' Tab

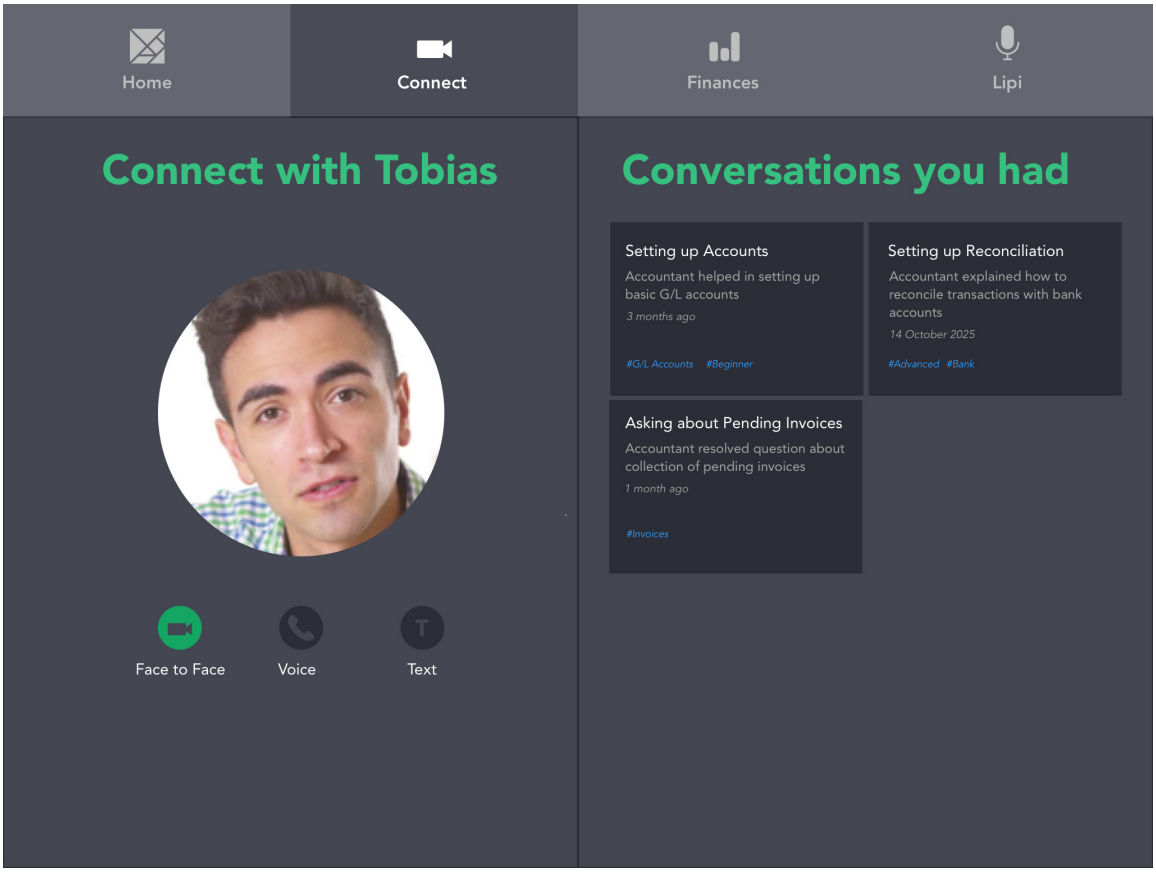
see that they are becoming angry or aggressive.

At the same time, the entrepreneurs do not want to see their own emotions. This was also mentioned in feedback from an entrepreneur where they mentioned that if they see their emotions, this will distract them and they may try to manipulate their own emotions.

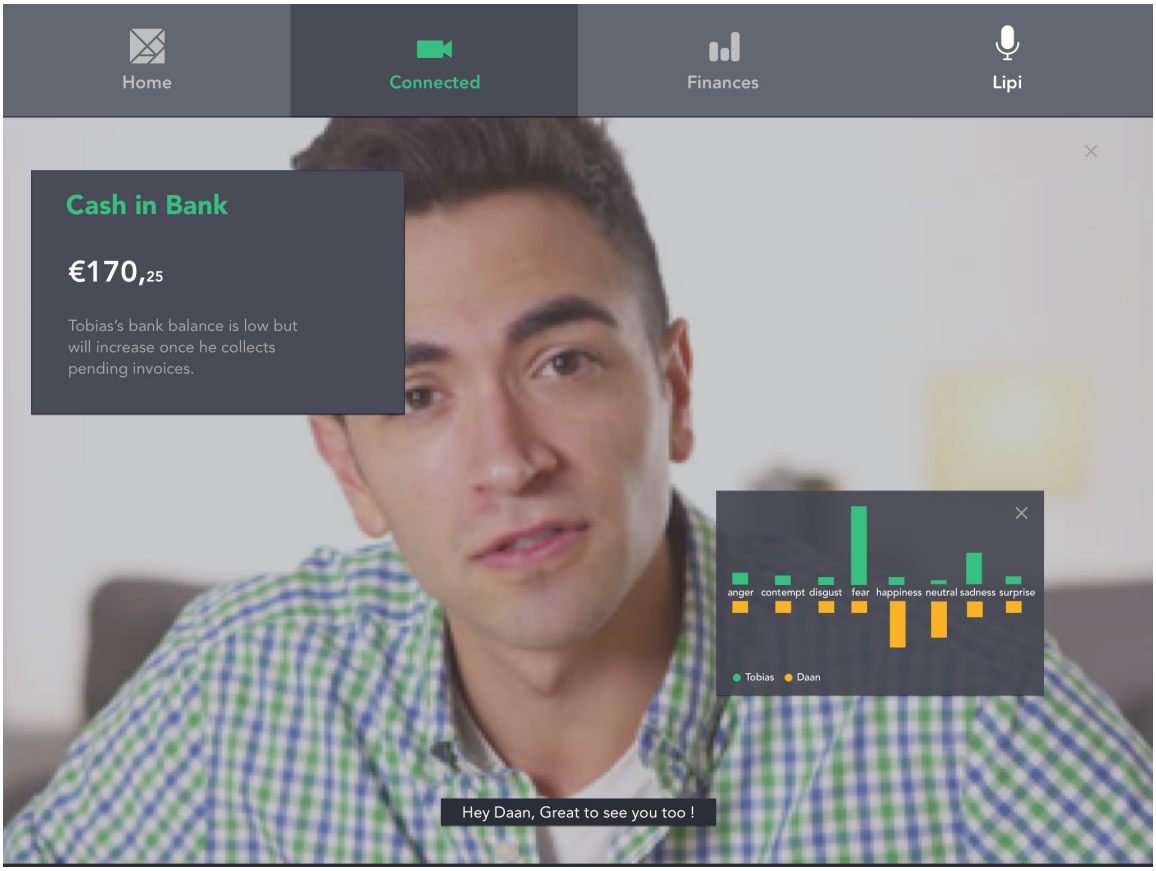
The Accountant 'Finances' Tab

In this tab the accountant can see the financial details of all the clients. This makes it easy for the accountant to think about where exactly are clients faltering, and what would be the best advice for them.

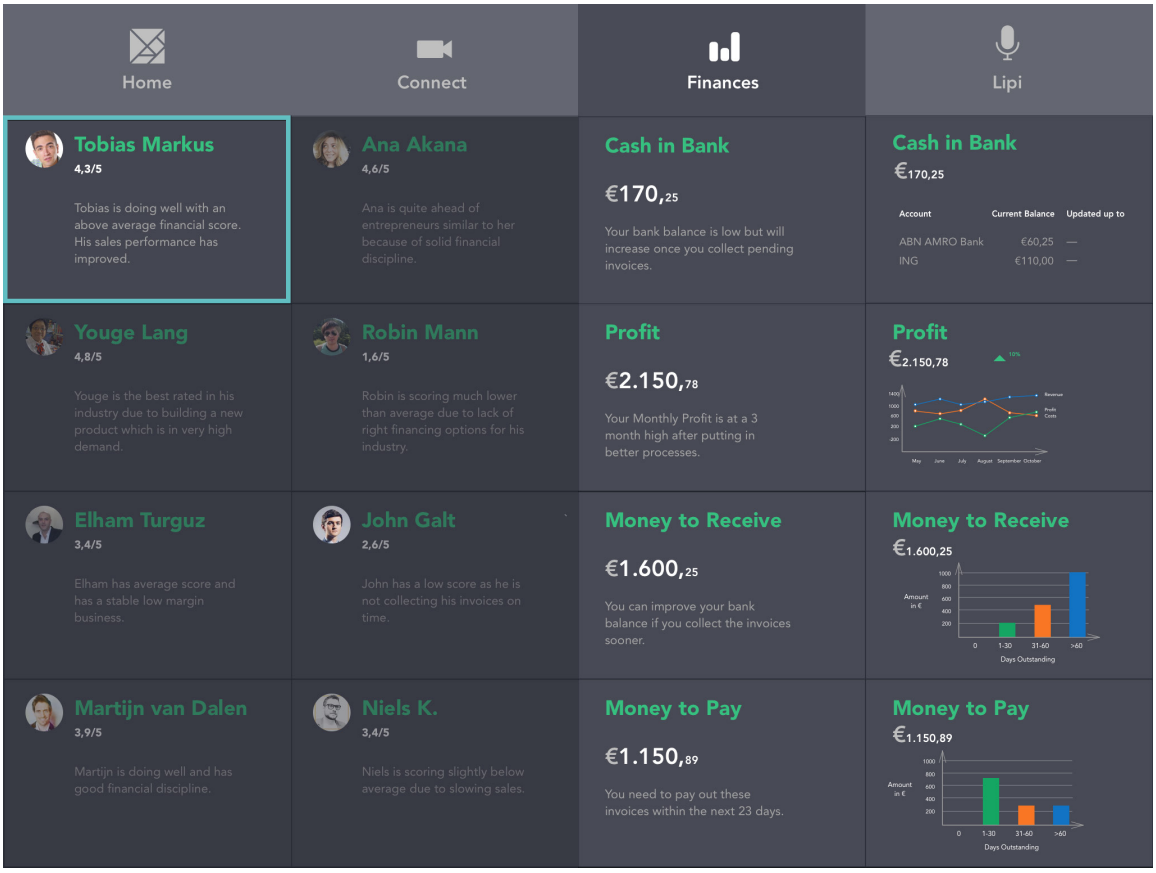
Picture 37. The Accountant 'Connect' Tab



Picture 38. The Accountant 'Connect' Tab - after tapping an entrepreneur card



Picture 39. The Accountant 'Connected' Tab, with visible dynamic emotion graphs



Picture 40. The Accountant 'Finances' Tab, with details of all clients

6.6 Branding & Communication

The concept was branded to make it simpler to communicate to all stakeholders.

Brand Name, Logo and Tagline - Centaur

The name 'Centaur' literally refers to characters in Greek Mythology who are have the upper body of human beings and lower body of horses. This makes them more mobile and stronger. In popular culture, they can also be found in the Harry Potter books. However, I came across it in learning about advances in Machine Learning. In this context, man and machine combinations are called Centaurs, and they are known to perform well against both only human or only machine opponents.

Since this concept is about combining the power of man and machine, the name Centaur looked like a good fit.

When considering the logo, the key idea was to communicate 'intelligence' - this is the key product quality. Initially, a snowflake was considered, as it is a complex and symmetric shape. But based on informal feedback and more consideration, it was changed to a tangram - because a tangram represents how different pieces of a puzzle can come together to make a new whole. Thus, it represents intelligence, which is the core of the concept. The explorations are shown in **Picture 41**.

Initial tagline was 'intelligent collaboration' - to bring out how the software helps the accountants and entrepreneurs in working together. But after some discussions and ideation, it was reconsidered.

The tagline was revised to **'High Performance Accounting**' for the following reasons:

- The purpose of intelligence is performance. That is the end goal. Hence it was seen as better to have the goal in the message.
- Centaur helps performance of both entrepreneurs and accountants. Even the emotion graphs are present to improve the 'emotional' performance of the accountants.
- It was seen important to include the word 'accounting' to communicate the domain of the product. The words 'intelligent collaboration' do not say anything about the domain.

Further messaging was developed to underscore the 'Control' and 'Connect' aspects of the product (**Pictures 42-44**).

= exact
CENTAUR
intelligent collaboration

= exact
CENTAUR
intelligent collaboration

= exact
CENTAUR
intelligent collaboration

= exact
CENTAUR
intelligent collaboration

Picture 41. Brand logo and tagline explorations

CONTROL

Your daily performance
with smart insights

CONNECT

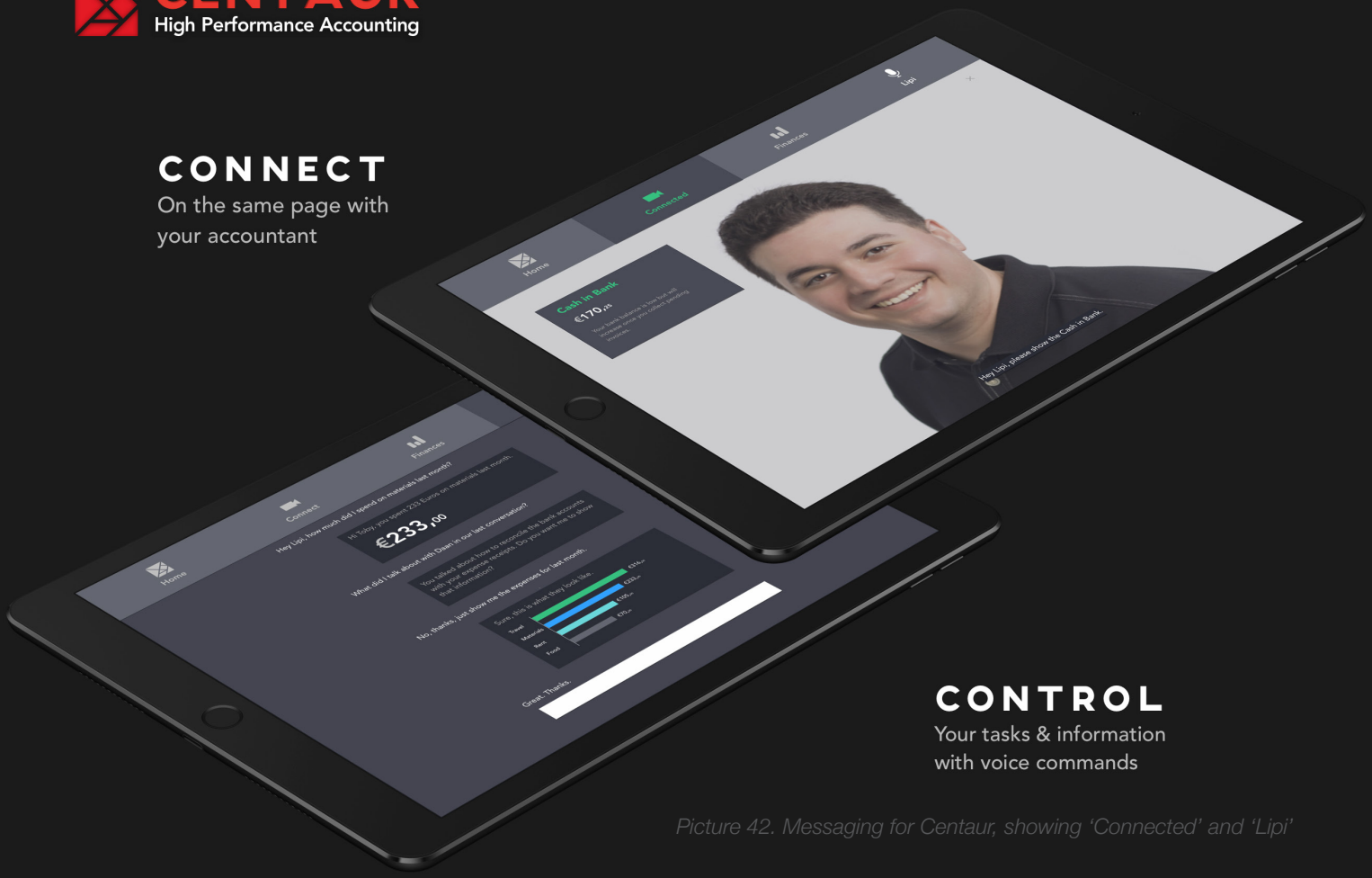
On the same page with
your accountant

Picture 43. Messaging for Centaur, showing 'Connected' and 'Home' Tab

CENTAUR
High Performance Accounting

CONNECT

On the same page with
your accountant



CONTROL

Your tasks & information
with voice commands

Picture 42. Messaging for Centaur, showing 'Connected' and 'Lipi'

Picture 44. Looking at Centaur in context of use

Naming 'Lipi'

The word 'Lipi' is a Hindi word which stands for writing, letters and alphabet. Since accounting developed with the invention of writing, this name was deemed suitable for an accounting product. The following reasons reinforced this choice:

- It is easy and simple to speak.
- It is not an existing word in the English or Dutch languages, hence it is unique and will not be confused with other words when having a conversation.
- It is phonetically similar to 'Lippy' - which has the connotations of Lips, and hence of speaking.

Other names like 'Divvy' and 'Ella' were also considered, but eventually discarded.

Press Release and FAQ

To clearly demonstrate the benefits of the product in simple, consumer oriented language, a press release was articulated. The release brings out the key benefits for both entrepreneurs and accountants. This is shown in **Picture 45**.

A detailed section of Frequently Asked Questions (FAQ) was also developed to explain the concept in detail. It anticipates the questions users might ask when they first hear about the product. This is present in **Appendix A11**.

Creating a press release and FAQ is standard product design practice at Amazon.com (S. Mathur, Personal Communication, 2017) where it helps in clearly formulating the benefits of the product in simple language which consumers can understand. Actual Amazon.com press releases were studied for inspiration to design this press release.

No switching between windows, no screen sharing, no hassle. Entrepreneurs and Accountants stay on the same page, literally.

= exact Home Products Branches Support Blog News

PRESS RELEASE

SMEs Rejoice ! Exact unleashes the Future of Accounting

Exact launches Centaur, the next generation software to control your finances
Centaur uses machine learning to generate financial insights
Touch and talk - voice commands make interaction seamless
Accountants can now reach more clients with enhanced video calling

Delft, Netherlands (The Volkskrant) - Nov 9, 2025 - (NASDAQ: EXCT) - Today, Exact announced the public launch of its new breakthrough product Centaur. It combines the power of man and machine to guide entrepreneurs in taking the right steps for better financial performance.

"Exact has a 40-year old history of empowering SMEs and this is the next monumental step in our mission," said Hessel Wellema, Chief Marketing Officer at Exact. "Now both entrepreneurs and accountants can have better focus on what they do best. Centaur will enhance their collaboration in ways it was never possible before."

Most entrepreneurs find that accounting is a confusing mess. They have no time to understand accounting jargon when they are busy growing their business. They call the accountant again and again for the same questions, and feel anxious about dealing with complex laws and regulations.

Enter Centaur. Centaur gives the entrepreneur a financial performance score, and using insights generated from machine learning, tells them exactly what to do to improve it. All in simple, human-readable language. The entrepreneur does not even need to type or click. The interface is completely voice and gesture controlled, so the entrepreneur can simply touch and talk to the software. She can quickly 'get' her performance and get back to her business. Now.

Moreover, she does not need to call the accountant again for any conversation which has happened. All communication is transcribed and summarized. The entrepreneur can simply look up the summary, and be reminded of the task, or they can dig in the details to see complete transcripts. No insights are lost, no advice needs to be repeated.

The voice assistant 'Lipi' can handle all kinds of queries, as well as add tasks and reminders:

Hey Lipi, how much did I spend on materials last month?
Hey Lipi, show me the breakdown of expenses for last 3 months.
Hey Lipi, remind me to collect invoices before next week.
Hey Lipi, what did I talk about with my accountant last month?

"I feel a big load off my back with Centaur", said Tobias Markus, an SME making materials for 3D printing in Delft. "It tells me what I need to do, so I never need to worry. I ask Lipi all kinds of questions to understand my finances, and make better strategies to grow. Thank you Exact !"

On the other hand, accountants find it difficult to grow their business more than 30 kilometers away. They need face to face meetings to truly understand their clients, and provide better, more compassionate advice. After all, every client is different. But with today's traffic conditions, regular travel to large distances is simply not feasible.

Centaur gives them wings. Accountants can use the enhanced video calling to get in touch with clients who are far away. They can see the client's financial performance in a simple and clean interface before calling, and know exactly what the client needs. While calling they can see the client's as well as their own emotions in real time. This is like talking in real life, but better. Moreover, when calling, they can use the financial charts within the same view. No switching between windows, no screen sharing, no hassle. Entrepreneurs and accountants stay on the same page, literally.

"Enhanced video calling is something else," said Daan van Amstel, founder of van Amstel Accountants in Amsterdam. "I know what my clients need, both financially and emotionally. Since Lipi takes care of routine advice, I can focus on deeper strategy and emotional needs of my clients - from the comfort of my office. My business has grown much beyond Amsterdam now, and I plan to go beyond Netherlands soon !"

"Centaur has changed how my accountant deals with me", added Tobias. "He seems to know exactly what I think and feel, and tells me opportunities which I could not have imagined."

Customers can download the Centaur app from the iOS App Store or Google Play Store and login with their Exact Online credentials, or make a new account. For more information and FAQ please visit https://exactcentaur.wordpress.com/.

About Exact

Since 1984, Exact software has one mission - to empower SMEs to be a driving force of the global economy. It is committed to fulfill the mission by providing the best software tools to its clients all around the globe. For more information, visit exact.com and follow @ExactOnline on Twitter.

Picture 45. Press Release for Centaur

CHAPTER 7

Business Model & Roadmap

Bringing the idea into contact with the **messy real world.**

7.1 Business Model Canvas

Given the technological sophistication and futuristic design of this product, the business model given here is only indicative. The development of this product will require deep investment from Exact as the technological requirements are quite extensive. The business model can be the SaaS based model with subscription based revenue for both entrepreneurs and accountants.

The business model is outlined in the Business Model Canvas taken from Osterwalder and Pigneur (2010) as shown in **Figure 40**. Since this product is aimed for a market of 2025, details of this canvas will change. However, it is possible that some of these services (or new services which essentially fulfil the same function as the given services) will exist. For example, while today the app distribution is done by App Store and Play Store, it might be done by some other new app platforms in the future, but there will always be a need for marketplaces for new software applications.

Customer Segments

The core segment is SMEs, and this is in line with the vision of Exact. Some of the startups can also be a part of this as they grow. While freelancers would also benefit from this application, they are not a core target segment, this is because freelancer needs are often met by automated software and they do not need personal advice.

On the other side, Accounting firms serving these SMEs are the key segment for Centaur.

Value Proposition

The value proposition flows from the product design. The key values are mentioned in this section. Most value goes to the SMEs, as the product is designed by keeping them in mind.

Channels

Since this a digital product, the primary channels are the App Store (by Apple) and the Play Store (by Google), as well as the company website. Social Media platforms like Facebook and Twitter will also be used. There will be a dedicated line for online calling and support. Finally, new customers would be reached from industry conferences for both entrepreneurship and accounting.

Customer Relationships

The customer relationship can be identified as:

- Co-creation - this is because every conversation generates information which is used by everyone else. Thus, the customers - both entrepreneurs and accountant contribute in creating the product by making it better with every interaction.
- Personal Assistance - This will be provided by dedicated customer support team. Since the product is very new, there may be more support needed in the initial phases of the product launch.
- Automated Services - Since Exact has all the data on its customers, the customer contact could be automated to some extent, with tailored assistance according to customer needs. Hence, automated services also characterize customer relationships.

Revenue Streams

For revenue, there will be a monthly subscription fees, both from entrepreneurs and accountants. Special offers could be tailored (for example, first 3 months free for startups), according to business needs and sharper customer segment focus at the specific moment in time.

Key Resources

The key resources are human resources - developers and designers who can create the complete product from all dimensions. Apart from this, there will be a lot of server infrastructure needed at the back-end for cloud space. Since every conversation will be stored, with time, there will be more space needed. But since storage costs have been going down, this should not be a big challenge.

The Exact Online Code-base is another key resource as the back-end of data will not be needed to be built again. Also, existing data of customers' will help in creating better insights for performance.

Finally, the Exact brand name and image is a valuable asset which will help in gaining customer acceptance as well as deals with partners.

Key Activities

For Exact the key activities are design and development of the product. There will need to be other activities like sales,marketing, distribution, and partnerships.

Key Partners

Widget Makers like Trello are the key partners for the product. In order to distribute the product, they will also need to leverage their partnerships with industry bodies and accounting conference organizers.

Cost Structure

Figure 40. The Business Model Canvas for Centaur

The costs will be mainly fixed costs of design and development, and of server space. Fixed costs will also include maintenance and support costs.

7.2 Strategic Roadmap

The roadmap shows all the features of the product classified into three key phases:

Research

This is where Exact needs to research the feature in more depth and at higher fidelity. In-depth user research with high fidelity prototypes

Develop

This is where Exact starts developing the code for the feature once the user research has been completed and tested. Deeper level beta-testing can be done in this phase.

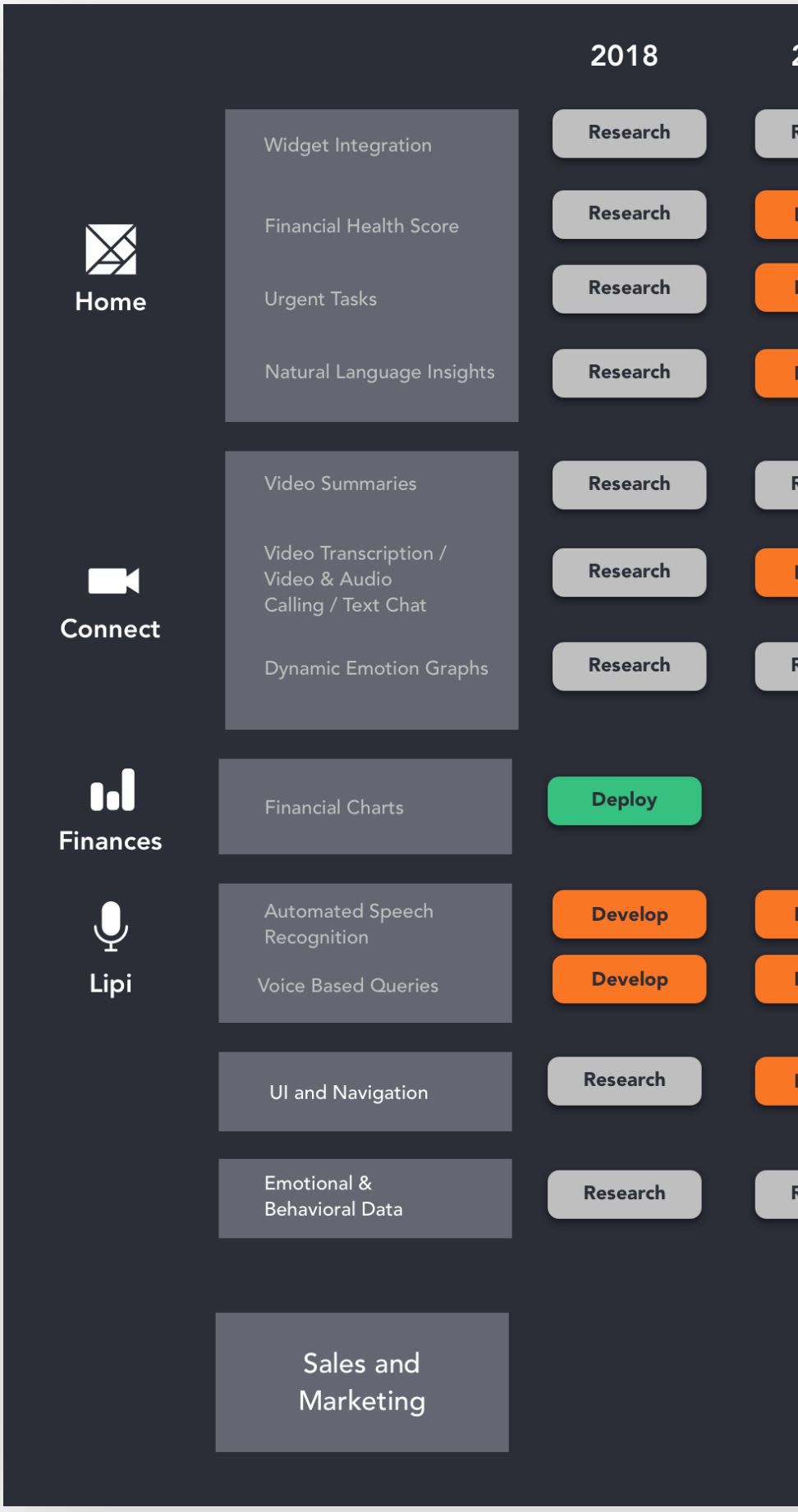
Deploy

Deployment simply means pushing the code into production and launching the feature.

In this roadmap, most of the deployment has been done by the year 2022. But this is because it is assumed that research and development on all these tasks can be started at the same time. In reality, this will be subject to manpower and budget constraints which have not been taken into account. Hence, actual implementation should take more time.

Finally, some features may be developed earlier, or some might be bought off-the-shelf directly from other software vendors and be integrated into Centaur. These decisions remain to be seen according to the priorities of the market at the time.

Strategic Roadmap for Centaur

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Develop
Deploy
Research
Branding
Partnerships
Launch

CHAPTER 8

Feedback and Evaluation

The strengths, weaknesses, and directions for **the future.**

As a designer, it is easy to think that your ideas are the best because you have put in the time for the research and developing ideas. However, at the end, all design is about the user. At the same time, it is also a good idea to get the opinions of design experts who can provide insights from their experience. This chapter describes how the evaluation was carried out.

8.1 Goal

It was intended to understand which areas could be improved, as well as understand which areas were appealing to the users. Some of the recommendations were included in the final design, while others remain as recommendations for further development of the concept. Since the ViP method stresses on original solutions, it was also considered important to check whether the concept was perceived as innovative.

The goal was to answer the following questions:

- Does the concept have potential to make entrepreneurs take better control of their financial tasks?
- Does the concept have the potential to enhance the relationship between entrepreneurs and accountants?
- Is the concept seen as innovative and of high quality?
- What are the strong points of the concept?
- What are the key areas of improvement for the concept?

8.2 Method

Since this is a visionary concept, the method is slightly informal because the goal is not to evaluate the full usability of the product, but to explore what are the best areas for further development or refinement of the concept. There were two key ways the evaluation was performed - Qualitative, and Quantitative. The former were done by in-depth interviews to understand how the concept fit their needs. The latter was done to reach a wider audience, and to look at parameters quantitatively.

Method for Initial Qualitative evaluation

For qualitative evaluation, in-depth interviews were taken with 2 entrepreneurs and 1 accountant. These were taken just before the final design. These interviews were semi-structured and had three main questions:

- What does the user like about the concept?
- What does the user wish the concept had?
- What cases the user can think of, which are not addressed by the concept?

I sat together with the participants and walked them through the concept, to understand how it would fulfil their needs and asked them to 'think aloud' as we explored the concept step-by-step. The data was captured using voice recording as well as capturing notes by the researcher.

This exercise resulted in some solid insights both in terms of functionality and the user interface. Some of these insights were included in the final design. For example, initially, the concept had a detailed emotion dashboard, but this was removed completely, because it was hard for the users to understand.

Method for Quantitative Evaluation

After the final design, an online questionnaire was prepared to get more quantitative feedback on the final concept. This questionnaire was sent out to entrepreneurs, accountants, design experts as well as marketing managers at Exact. This questionnaire also had some qualitative questions at end - which were geared towards concept strengths as well as improvement areas. The detailed interview questions are present in **Appendix A12**.

This questionnaire had a link to a 16 minute long Youtube Video (https://www.youtube.com/watch?v=2vxAGtKAF_U) explaining the concept with its goals and interactions in detail.

This questionnaire received thirteen responses. These were from:

- 6 Entrepreneurs
- 3 Design Experts
- 2 Product Marketing Managers at Exact
- 2 Accountants

Finally, apart from these, the video was also shared with some key stakeholders at Exact and their feedback was taken either in-person or via e-mail.

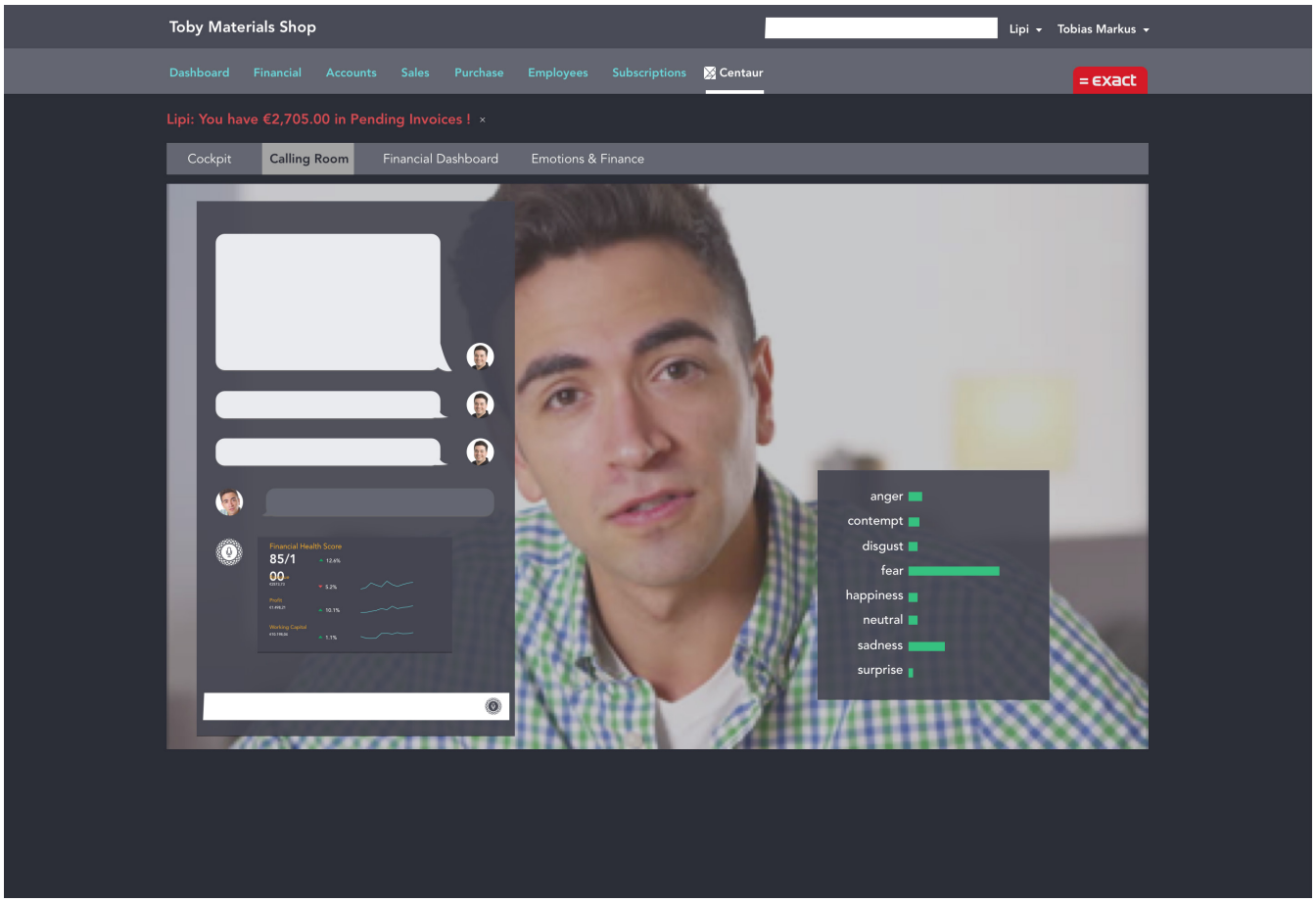
8.3 Evaluation Outcomes

Key takeaways and Steps taken based on Qualitative Interviews

Since these were done before the final design, these helped in shaping the final product. They helped in both adding and removing two key features. First, let's look at the addition of a new feature.

Adding emotion graphs for accountants

In the initial iterations for the accountant view of the concept, there was the emotion graph of the entrepreneur visible to the accountant. This is shown in **Picture 46**.



Picture 46. Earlier design of dynamic emotion graphs showed the entrepreneur's emotions to the accountant

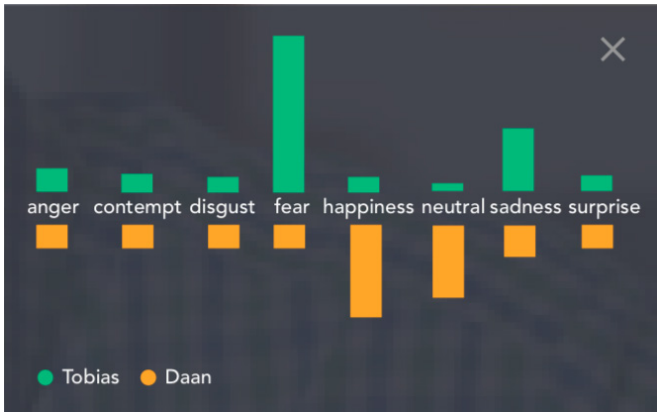
When showing this to the accountant, he said that apart from the entrepreneur's emotions, he also wanted to see his own emotions. This was because many times accountants can become confrontational with the entrepreneurs while giving them advice, and this can harm their relationship. But if they can see their own emotions in real-time, this will help them in restraining themselves. By being more self-aware about their own emotions, they can thus provide better advice. This resulted in addition of the accountant's emotion graph (**Picture 47**) to the concept.

Removing Emotion Graphs from the Entrepreneur view

The entrepreneurs shown the concept said that they did not want to see their own emotions while talking to the accountant, as that would distract them. Hence, emotion graphs were removed from their video calling screens completely.

Removing Emotion Dashboard Completely

The initial concept had an emotion dashboard to explore entrepreneur's emotions along with his or her financial data. This was based on the finding that more and more data is becoming available on human emotions, and relating that data with financial performance could potentially uncover insights.



Picture 47. The dynamic emotion graphs were re-designed to show emotions of both sides

Hence, an emotion dashboard was included in the concept which would correlate the emotions to financial performance, and hence help the entrepreneurs manage both of these key variables. This is shown in **Picture 48**.

However, this was removed completely for two reasons. One, the entrepreneurs were not sure if they saw Exact as a company which would provide them data on emotions. For them, Exact was an accounting service provider. They would not rely on data on emotions from Exact. To solve this, we brainstormed an approach where the emotional data could be provided by an external source (like Fitbit) and integrated into a widget in Centaur, just like for now, Trello is integrated for task list.

However, even then, the concept was not very clear. After the interview of the accountant, it emerged that it was very hard to understand clearly what role do emotions play in financial performance, and how exactly are emotions measured and how they vary everyday. In the end, this idea generated more unresolved questions than it could answer.

While it was still seen as a potentially positive direction, a more concrete design was not feasible in the given time frame, hence this idea was removed from the concept.

Changes in the User Interface

Based on feedback from one entrepreneur, some UI changes were also made. For example, initially the interface showed the video conversation as bubbles. These bubbles are visible in **Picture 49**. Here the entrepreneur, who also happened to be a design graduate from TU Delft, remarked that bubbles gave him a feeling of 'chat', and not a serious conversation. Also, having such an interface also blocked the face of the person being talked to, and thus harming the quality of the conversation.

Based on this advice, the bubbles were removed and the voice transcription was designed to appear one line at a time, similar to closed captions titles in YouTube videos or movie subtitles.

It can also be noticed that these designs were made for a desktop interface, and thus looked a bit more complex. After this feedback, I decided to implement the design for an iPad instead. This was great help in forcing me to focus on the essential features of the concept, and also in making a more clean and simple interface. Moreover, it is easier to adapt a design for a smaller screen (like a phone or iPad) to a larger screen rather than the other way round. Finally, in 2025, there will be many more touch-screens with growing mobile phone and tablet penetration, hence designing for the iPad had a strong rationale.

Key takeaways from Quantitative Evaluation

It is important to note that there were only 11 responses to the survey, and only 6 from entrepreneurs. Moreover, only 2 of these were SMEs (other being startup entrepreneurs or freelancers). None of the accountants responded in the given time frame. Hence these results are not very robust quantitatively.

However, they do serve as good indicators about what are the strengths and weaknesses of the concept.

Strengths of the Centaur Concept

Most participants liked the simple and easy to navigate design. Most accounting software is very complicated, and a simpler design is very much desired.

Given that new, fast growing competitors like Xero also have focus on clean and beautiful design (as mentioned in **Section 2.2**), this was a helpful finding supporting the concept.

Most participants also liked the dynamic emotion graphs. They mentioned that this could greatly improve the communication between the accountant and the entrepreneur.

Other strength areas:

- Task list integration with Trello
- Overall Financial Health Score

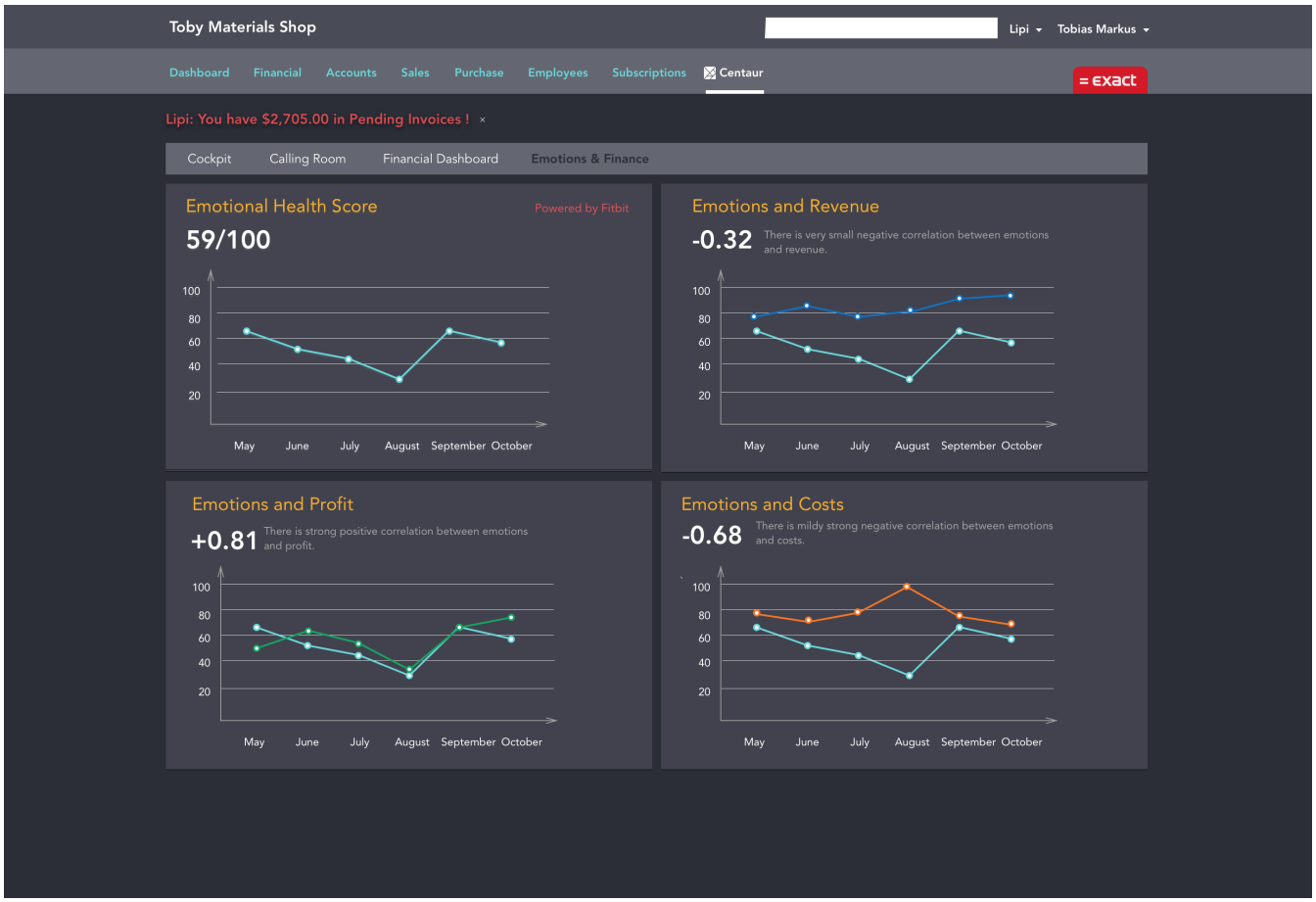
Areas of Improvement for Centaur

The most repeated factor was how the overall financial score did not help much. The users wanted more than an overall score. They wanted to know what it meant, and to know what to do with their health score. While this was meant to be visible from the 'urgent tasks', it was not apparent to them. Hence the next iteration of the interface should connect the score more directly to actions needed to be performed by the entrepreneur or the accountant.

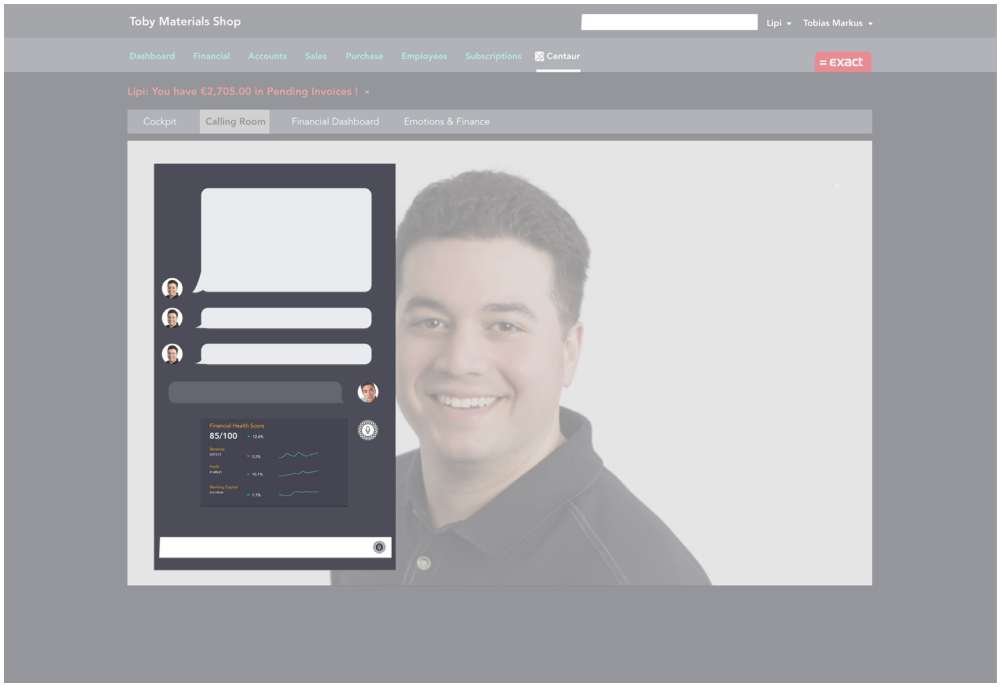
The below picture suggests some changes. One, an overall rank could be added to financial health score - this would gamify the financial performance, and thus push entrepreneurs to perform even better. Giving them a rank would feed their competitive spirit, and thus result in better performance.

Similarly, in the 'Urgent' tasks, there can be numbers beside each task, which indicate how much their financial score will increase, once they complete the task. This would be a clear link from what the score is now, to what it can be in the future, and how to get there. This is shown in **Picture 50**.

Some feedback was also around making the interface more customized by letting the entrepreneur add goals, and resize



Picture 48. Earlier design contained metrics related to 'Emotional Score' of entrepreneurs and how these could relate with their financial performance.



Picture 49. Earlier designs contained a chat-like interface for conversations between entrepreneurs and accountants. These were re-designed based on user feedback.

and minimize windows.

8.4 Recommendations for the Future

While the previous section already provides some direction for the future product refinement, in this section we look more closely at how this concept can be improved and grown in the future.

Gamification in Accounting

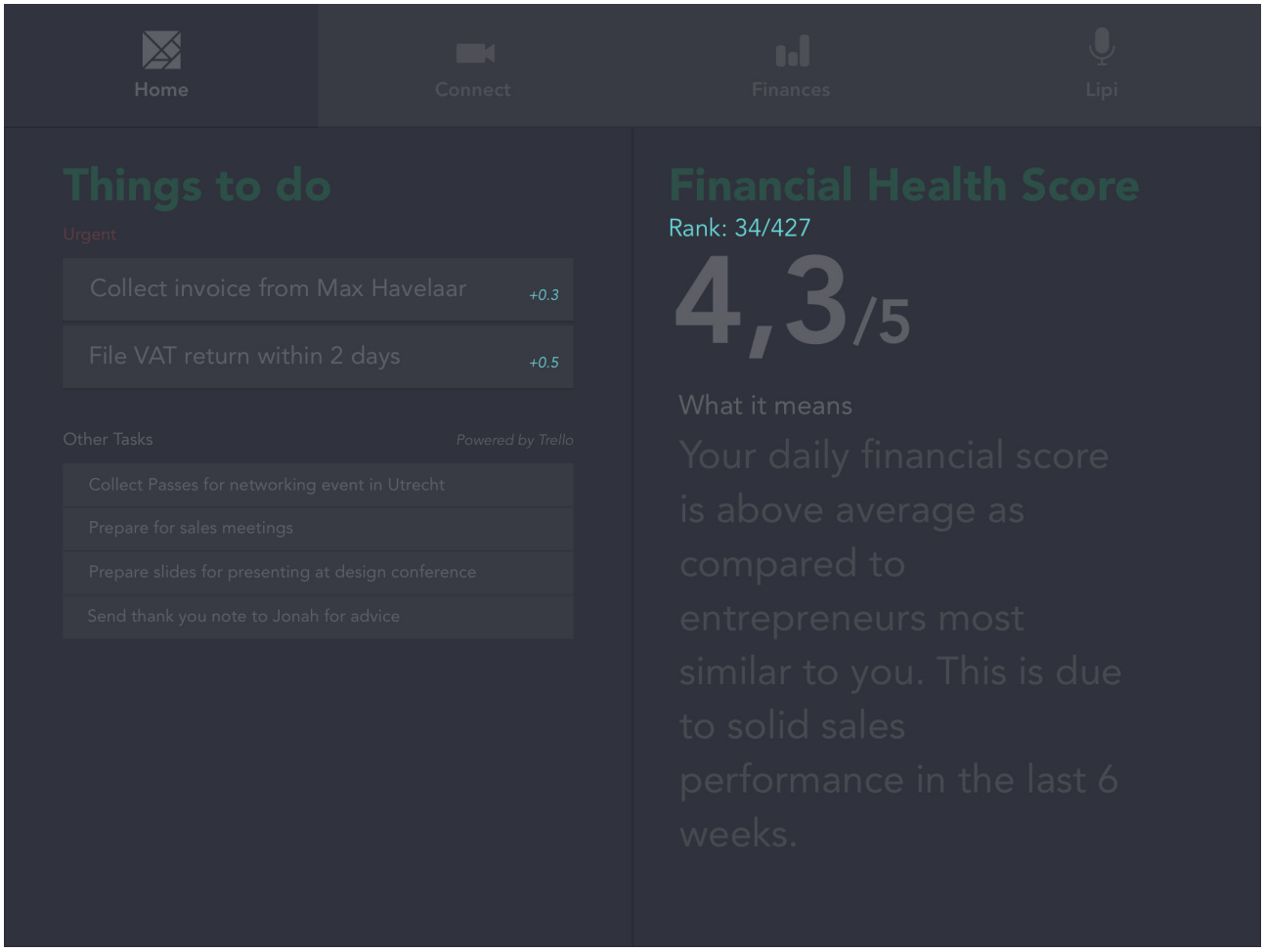
There has been an effort in the concept to make financial performance more gamified with scores and trends in scores. In a data-driven future, gamification can lead to much better performance. Exact already has the financial data of thousands of entrepreneurs. They now need to figure out how exactly can a good overall financial score be calculated, and what is the best way to communicate it. Centaur then provides the right interface to integrate the score.

Dynamic Emotion Measurement and Impact

The dynamic emotion graphs came out as key strengths of Centaur, but these are in a very conceptual phase right now. Exact should research more about how to implement these. How do they really affect the relationship? How do accountants actually react when they can see their emotions getting out of control? Apart from these factors, the method of representation of emotions itself can be researched. For example, instead of bars, maybe color themes (similar to Instagram filters) can be used to show the entrepreneur's mood and feelings.

Data on Behavior

While Centaur could not be developed to understand how emotions, personality, and behavioral traits of entrepreneurs can be correlated with their financial performance, this



Picture 50. Possible changes to 'Home' tab for Entrepreneurs with clearer meaning of financial health score

remains a clearly promising area of investigation. Exact should research how to collect and use this data to empower entrepreneurs.

Rating the Summaries

One promising feedback from an accountant was about rating the conversation summaries. He mentioned that after giving advice on a video call, the accountant should be able to review the advice and rate it according to how it works out for him. This will help the accountant in learning from his or her own advice. This will also help the algorithms of Centaur in selecting the best rated summaries to provide to other entrepreneurs, thus making the system much smarter.

Refining and Testing the UI

While the UI was received very positively, would could still be parts where it is not very customizable or easy. Rigorous testing of the UI in a prototype should be carried out to smooth out any possible friction in navigation. Some areas of improvement could be around changing sizes in the 'Connect' Tab - and giving more space to the summaries. This is because calling can be done with just one button and does not need half a screen. Also, the UI needs to be adapted to multiple kinds of screen sizes - including mobile as well as desktop screens.

"I think what makes your concept strong, is the 'connect' functionality. Where you can have a video-call with the client and information is added to the screen instantly. I think this is a huge time saver and very great from an experience point of view. Also, the emotional intelligence part will add a lot of value I think to the conversations. Therefore I would give the 'connect' feature a more prominent place in the concept."

Manager UX Design at Exact

"I scanned through your video and I really like the idea for Centaur. Funny how close it is to our '[internal project]' (although that lacks the whole Robotization part).

Also it is visually appealing to me!"

Senior Product Manager at Exact

CHAPTER 9

References

We stand on the
shoulders of giants.

Apax Funds Raised. Retrieved July 1, 2017, from Apax Partners Website: http://www.apax.com/inside-apax/company/funds/

Becker, R. H. and L. M. Speltz (1983). Putting the S-Curve Concept to Work. *Research Management*, 26, September-October, 31-33.

Brynjolfsson, E., & McAfee, A. (2017). *Machine, platform, crowd: harnessing our digital future*. WW Norton & Company.

Burgess, R G. (1984). Autobiographical accounts and research experience. In R. G. Burgess (ed.), *The Research Process in Educational Settings: Ten Case Studies*, pp.251-270. Lewes: The Falmer Press.

Christensen, C. M. (1992). Exploring the limits of the technology S-curve. Part I: component technologies. *Production and Operations Management*, 1(4), 334-357.

Department of Accounting, *Foster School of Business*. Retrieved 31 December 2013 from Foster school of Business website: http://foster.uw.edu/faculty-research/academic-departments/accounting/

Dorbian, I. (2015, April 15). Apax Partners closes buy of Exact for 740 mln Euros. *The PE Hub Network*. Retrieved from https://www.pehub.com/2015/04/apax-partners-closes-buy-of-exact-for-730-mln-euros/#

Dror, N. (2017, May 28). Innovating on the infrastructure of innovation [Blog Post] Retrieved from https://medium.com/@nivo0o0/innovating-on-the-infrastructure-of-innovation-5e2afe34fab5

Drury, R. (2013). Xero raises $US150m [Blog Post]. Retrieved from https://www.xero.com/blog/2013/10/xero-raises-nz180m-us-global-growth/

Evans, B. (2017, March 23). The end of smartphone innovation [Blog Post] Retrieved from http://ben-evans.com/benedictevans/2017/3/22/the-end-of-smartphone-innovation

Evans, B. (2017, May 6). Ways to dismiss technology [Blog Post] Retrieved from http://ben-evans.com/benedictevans/2017/5/24/not-even-wrong-ways-to-dismiss-technology

Exact Holding NV (2014). Exact Holding NV 2014 Annual Report. Retrieved from http://flipbook.exact.com/ar/2014/HTML/files/assets/basic-html/index.html#1

Foster, R. 1986. *Innovation: The Attacker's Advantage*. New York: Summit Books.

Ghauri, P. N., & Grønhaug, K. (2005). *Research methods in business studies: A practical guide*. Pearson Education.

Glaser, A. (2017, May 31). Google's ability to understand language is nearly equivalent to humans [Blog Post] Retrieved from https://www.recode.net/2017/5/31/15720118/google-understand-language-speech-equivalent-humans-code-conference-mary-meeker

Hekkert, P. (2006). Design aesthetics: principles of pleasure in design. *Psychology science*, 48(2), 157.

Hekkert, P., & Van Dijk, M. (2011). *ViP-Vision in Design: A Guidebook for Innovators.* BIS Publishers.

Henio, Edrian. 1992. "Accounting Numbers as 'inscription': Action at a Distance and the Development of Accounting." *Accounting, Organizations and Society* 17 (7): 685–708.

Intuit Inc. (2016). Intuit Inc 2016 Annual Report. Retrieved from http://investors.intuit.com/Financial-Info/Annual-Reports/default.aspx

Kahneman, D. (2011). *Thinking, fast and slow.* Macmillan.

Kelly, K. (2017). *The inevitable: understanding the 12 technological forces that will shape our future*. Penguin.
Chicago

Kurzweil, R. *The Age of Spiritual Machines* (1999).

Lincoln, Y.S., & Guba, E.G. (1985). *Naturalistic inquiry.* Newbury Park, CA: Sage.

Linden, A., & Fenn, J. (2003). Understanding Gartner's hype cycles. Strategic Analysis Report Nº R-20-1971. Gartner, Inc.

Morse J.M. (1991) Strategies for sampling. In *Qualitative Nursing Research: A Contemporary Dialogue* (Morse J.M. ed.), Sage, theory implicitly assumes that the analyst will be creative' Newbury Park, California, pp. 127–145

Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: a handbook for visionaries, game changers, and challengers*. John Wiley & Sons.

Patton, M. Q. (2002). *Qualitative evaluation and research methods (3rd ed.).* Thousand Oaks, CA: Sage Publications, Inc.

Panetta, K. (2017). *Top Trends in Gartner Hype Cycle for Emerging Technologies, 2017*. Retrieved from Gartner Database.

Pearl, C. (2016). *Designing Voice User Interfaces: Principles of Conversational Experiences.*

Robson C. *Real world research*. 3rd ed. Chichester: Wiley; 2011.

Sage Group PLC (2016). Sage Group PLC 2016 Annual Report. Retrieved from https://www.sage.com/company/investors/2016-annual-report

Sahal, D. (1981). *Patterns of Technological Innovation,* Addison-Wesley, London.

Scott, B (2015, July 31). The Accounting Journal: Accounting Software grows up [Blog Post]. Retrieved from https://www.myob.com/au/blog/the-accounting-journal-accounting-software-grows-up/

Snoek, H., Christiaans, H., and Hekkert, P.M.M. "The effect of information type on problem representation." *Proceedings of the 4th International Design Thinking Research Symposium on Design Representation.*, 1999, Cambridge, pp. II-101-112.

Statista (2017). Number of smartphone users worldwide from 2014 to 2020 (in billions). Retrieved from https://www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/

Strauss, A., & Corbin, J. M. (1997). *Grounded theory in practice*. Sage.

Verganti, R. (2009). *Design driven innovation: changing the rules of competition by radically innovating what things mean.* Harvard Business Press.

Weber, Richard P., and W. C. Stevenson. 1981. "Evaluations of Accounting Journal and Department Quality." *The Accounting Review* 56 (3): 596–612

Wilson, R. A., and Alan Sangster. "The automation of accounting practice." *Journal of Information Technology* 7.2 (1992): 65-75.

Xero Limited. (2017) Xero Limited 2017 Annual Report. Retrieved from https://www.xero.com/content/dam/xero/pdf/Xero%20Annual%20Report%20FY17.pdf

Yli-Huumo, J., Ko, D., Choi, S., Park, S., & Smolander, K. (2016). Where Is Current Research on Blockchain Technology?—A Systematic Review. *PloS one*, 11(10), e0163477.

Zuckman, M. (2017, June 20). The fear and awe of techno-utopia, *Huffpost*. Retrieved from http://www.huffingtonpost.com/entry/the-fear-and-awe-of-techno-utopia_us_59498878e4b0c24d29f4782c

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“One of the things that happens when you’re an innovator is there’s actually no benefit to being really, really fast…You’re the one creating the new stuff, so there’s no one who’s racing you. **It’s actually very important that you are slow and deliberate.**

Evan Spiegel

CEO, Snap Inc.