

Career-Counseling-as-a-Service (CCaaS): Enabling Value Co-creation Through AI-Powered Services Offered as an API-Based Solution

Semester Paper

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Declaration of Authenticity

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The author has used the help of generative AI tools, in particular GitHub Copilot, to write this paper. However, the use of AI tools has been limited to the generation of ideas for writing, paraphrasing cited sources, rewriting sentences for better readability, avoiding grammatical errors, and writing boilerplate L^AT_EX code. Any generated content has been manually and diligently reviewed and edited by the author to conform to the standards of scholarly communication, and to conceptually fit into the paper and the narrative.

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Dietrich Rordorf

Source code and versioning (not yet public):
<https://github.com/rordi/sbi-2023>

Abstract / Summary

This paper explores strategic business innovation in the context of career counseling. Using the latest generation of AI technology, we develop a new business model that we term *Career-Counseling-as-a-Service* (CCaaS). The main innovation of CCaaS is the use of AI-powered tools that are provided as a service to other stakeholders in the digital ecosystem surrounding the most powerful player in terms of users' employment, education and skills data, i.e., LinkedIn. We show that the business model can be implemented as a customer-centric innovation that fits the customer perspective, such as the need for highly personalized services and more affordable services. CCaaS enables and fosters the generation of more customer value through the co-creation of value as part of a value-network with career counselors, counseling companies, start-ups, and LinkedIn at its center. A multi-angled assessment of the business model shows that the business model is viable, that the innovation is technologically feasible, that risks are manageable and can be mitigated. Finally, using the System-FIT analysis, we show that the innovation fits in a new and unique emerging digital ecosystem of AI-powered career counseling that is controlled by LinkedIn.

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1 Introduction

The rapid progress in the field of generative AI and the now widespread access to advanced AI tools like ChatGPT have unleashed a new wave of speculations on how industries are going to evolve over the next few years, see, e.g., Chui et al. (2023); Chui, Roberts, and Yee (2022). Many companies are reconsidering how AI in general and generative AI in particular will affect their industries and ecosystems. One such industry is career counseling, which is also known as career guidance. Career counseling is the discipline and set of services related to designing career paths and consulting individuals regarding their career opportunities. In this paper we explore a new innovative business model in career counseling based on co-creation that we term *Career-Counseling-as-a-Service* (CCaaS). We envisage CCaaS as a set of next-generation, AI-powered career counseling services that are offered as an API-based solution. This new business model is embedded in a social and digital ecosystem of career counseling by leveraging the vast amount of data of the most powerful company in terms of professionals' career data, i.e., LinkedIn¹ and will enable new types of value co-creation by different actors in the ecosystem.

Digital ecosystems can be described as a complex, self-organizing, and adaptive system of actors (including current and potential competitors) and other stakeholders that are connected through digital platforms in order to create and exchange value. More specifically, Adner (2017) defines an ecosystem as follows: an “[...] ecosystem is defined by the alignment structure of the multilateral set of partners that need to interact in order for a focal value proposition to materialize.” By alignment structure, Adner refers to the mutual understanding and agreement of the position of different actors in the ecosystem, i.e., the roles they play and the relationships they have with each other (Adner, 2017, p. 42). While by “multilateral” and “set of partners” Adner refers to the fact that the ecosystems are composed of a multitude of actors, but also that these actors are members of the ecosystem and share the same goal of a joint value creation (Adner, 2017, p. 42-43). Digital ecosystems have gained tremendous importance over the last few years and translate into business growth and accrued financial success for companies (Weill & Woerner, 2015).

The remainder of the paper is built as follows. We will first introduce the customer perspective on career counseling before developing the value proposition using the Value Proposition Canvas (Osterwalder, Pigneur, Bernarda, & Smith, 2014). In particular, in Section 2 we will look at the customer perspective in terms of possible customer segments and their respective needs and drivers. Needs encompass *gains* and *pains* of the customer segments, while drivers encompass societal, technological and environmental trends and developments that make this business model possible. Further, we will describe the enablers of this new business model. Enablers encompass the resources available to the innovating company thereby increasing the likelihood of realization and viability of the new business model, and are described in Section 3. Then, we will describe the business model itself using an adapted version of the Business Model Canvas originally by Osterwalder, Pigneur, and Smith (2010) in Section 4. Specifically, the Business Model Canvas is adjusted for the digital age and value propositions that originate in a digital ecosystem (Schwaferts, 2023, p. 193-196). In particular, we will look at the value proposition, customer segments, channels, customer relationships, key resources, key activities, key partnerships, revenue streams, and cost structure of this business model and the contribution of the innovating company to the value proposition in the digital ecosystem. Further, we will detail the specific contribution of (strategic) innovation in this business model in Section 5. We will then evaluate the business model in terms of its viability and feasibility in Section 6.

¹<https://www.linkedin.com>

Finally, we will describe the fit of this business model with the system in which it is embedded using the System-FIT model (Schwaferts, 2020) in Section 7, and conclude with a summary of our findings in Section 8.

In the remainder of this section, we will give a background on career counseling as well as the strategic innovation potential that stems from the latest generation of AI technologies applied to this industry. This background information is based on the previous results of a literature review conducted as part of the course “Strategic Business Innovation” at the University of Applied Sciences and Arts Northwestern Switzerland (FHNW) (Käser et al., 2023).

1.1 Career Counseling

Career counseling entails the discipline and set of services related to designing career paths and consulting clients regarding their career opportunities. It is provided by career counselors, which are professionals that are typically trained in psychology, counseling, and career development. A career counselor’s job is to assess a client’s individual preferences, intelligence, skill sets, work values, and experience in order to help them find a suitable career path under consideration of the current educational, work, and community contexts (American Psychological Association, n.d.). Career counseling services are typically demanded by three groups: (1) individuals that are in the process of choosing a career, i.e., students that are about to enter the job market; (2) individuals that are in the process of optimizing or entirely changing their career, i.e., by changing into a different role or different industry; and (3) unemployed individuals that are in the process of reintegrating the job market. Further, in this paper will argue for another customer segment, namely companies engaged in the “war for talent” that are looking for ways to *retain* and further develop talent that already works for them. Although they are not direct beneficiaries of career counseling services, they are indirect beneficiaries in the sense that they benefit from the increased productivity and satisfaction of their employees.

Services in career counseling specifically include services in five areas: (1) career assessment, (2) development & training, (3) job search assistance, (4) career transitions, and (5) entrepreneurship-related services. *Career assessment* services entail the assessment of the traits of the client, including identifying their preferences, strengths, skills, and values and matching those with suitable career paths. *Development & training* services entail the development of the client’s skills and competencies in order to prepare them for a specific career path or fill skill gaps. *Job search assistance* services entail assisting clients in finding a job, including identifying suitable job opportunities, preparing for job interviews, and writing job applications. *Career transition* services entail planning and guiding clients through a transition into a new role and/or career path, including identifying suitable career paths. Finally, with *entrepreneurship-related services* counselors support clients in starting a business, including identifying suitable business opportunities, writing business plans, and assisting with incorporation. Entrepreneurship-related services within career counseling are typically offered by career counselors in job centers as one possible way to reintegrate unemployed individuals.

1.2 AI in Career Counseling

The use of technological innovation and AI in career counseling has been researched before. According to Westman et al. (2021) and cited in Käser et al. (2023), applying technological innovation in career counseling can lead to the following benefits: “*improved accessibility, increased access to information, automating assessments and coaching, network effects (e.g., on multisided platforms), improved cost-effectiveness, and new types of services*”.

Further, Westman et al. (2021) identified that AI could play a number of roles in career counseling in

the educational setting of schools and universities where students are in the process of choosing a career path. They identified four roles for AI, including as coach, collaborator, assistant, and tool (Westman et al., 2021). By *AI as coach* they refer to the use of AI as a virtual coach to provide career counseling services to clients; by *AI as collaborator* they refer to the use of AI to support career counselors in their work as a joint team; by *AI as assistant* they refer to counselors using AI in specific areas and validating the AI results on a case-by-case basis; finally, by *AI as tool* they refer to the use of AI for single, narrowly defined tasks, such as a job recommendation engine based on a client's skills profile (Westman et al., 2021).

1.3 Digital Ecosystem of Career Counseling

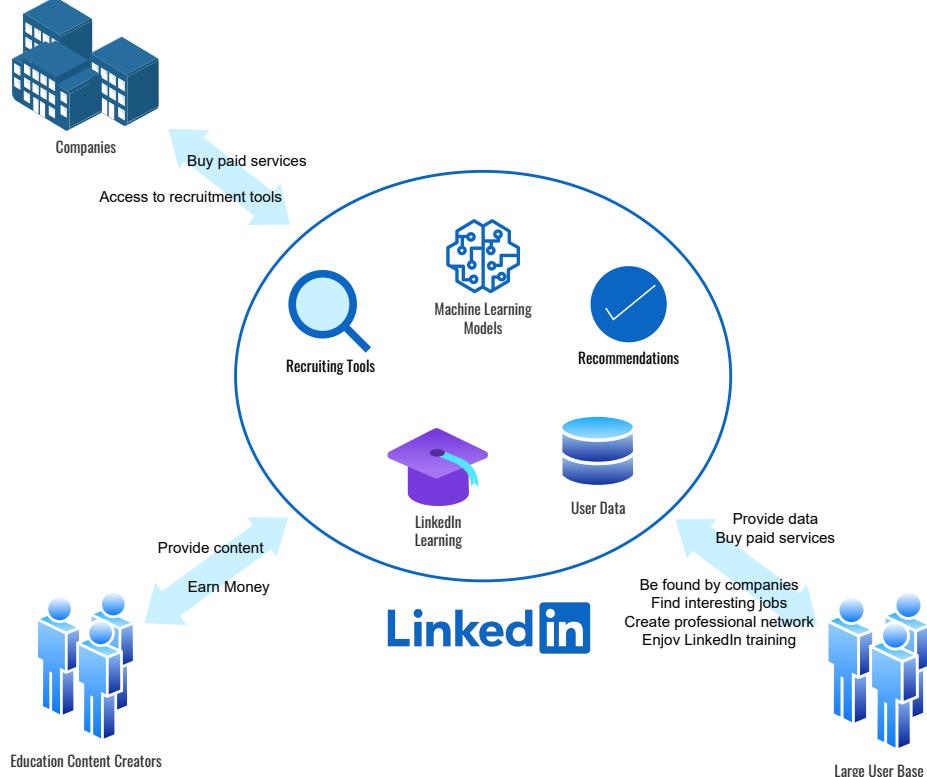
The digital ecosystem of career counseling is composed of a multitude of actors, including career counselors, clients, and companies. Career counselors are the service providers, whilst clients are the recipients of career counseling services. Companies can either be beneficiaries of the services that career counselors provide to clients, or they can actively engage as a member of the digital ecosystem surrounding career counseling. Such members may offer digital platforms and services that are used by career counselors, clients, or both. The most prominent example of such a platform is LinkedIn, which is primarily used by clients as a professional social network and to find jobs. Parts of the current ecosystem surrounding LinkedIn are depicted in Figure 1. Other types of platforms include specialized job search engines (such as Indeed and Glassdoor), career assessment platforms (such as ChoiZy or Uncavo), or e-learning platforms (such as Udemy or Coursera). However, many of these offerings are scattered across different platforms and not integrated as part of a digital ecosystem. For example, a client may first use ChoiZy to assess their skills, then use Coursera to learn and fill a skills gap, and finally use LinkedIn to land a new job.

According to the definition of digital ecosystems introduced previously, career counseling can not strictly be considered a digital ecosystem yet. While it meets part of the definition in terms of multilateral relationships between actors, it fails to meet the criteria of a *set of partners* that pursue a common goal of joint value creation (Adner, 2017). The reason for this is that the digital ecosystem of career counseling is not yet a fully integrated ecosystem, but rather a collection of loosely coupled actors that may also use different platforms for different use cases. The situation of career counseling thus presents enormous potential for strategic innovation by bringing all actors together and integrating them into a fully connected digital ecosystem of career counseling.

A true digital ecosystem could be created by integrating the services of other actors into the LinkedIn ecosystem. The key idea of the innovation is to add an API layer on top of LinkedIn that allows career counselors to access and leverage on the data, recommendation engines, and machine learning models deployed by LinkedIn. By using the API layer, the career counselors can be taken aboard the digital ecosystem. Also, new start-up companies may offer counseling services on top of the API layer to the other companies in the ecosystem. By using the API layer, counselors and other participating companies can participate in the value creation by providing additional, refined data to LinkedIn. LinkedIn can use that data to further improve the services and train even better machine learning models. For instance, career counselors may provide feedback on recommendations provided by LinkedIn, which can be used to further refine the recommendation engine. The resulting digital ecosystem is depicted in Figure 2. We term this emerging, truly digital ecosystem and business model *Career-Counseling-as-a-Service* (CCaaS).

The remainder of this paper will systematically explore the potential of CCaaS by evaluating the business model in terms of its customer centricity, technical and societal feasibility, economic viability and system fit. The next Section 2 introduces the customer perspective.

Figure 1: The LinkedIn ecosystem before applying the innovation, where LinkedIn controls the value creation (own illustration).

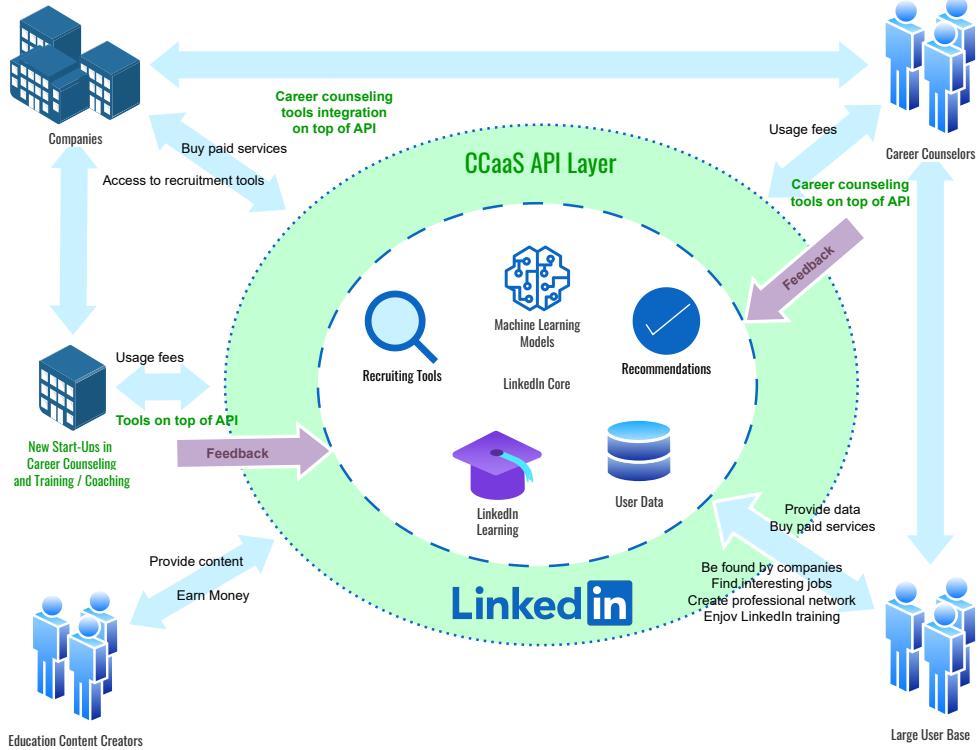


2 Customer Perspective

In order to develop a successful business model in the digital age, it is crucial to first understand the customer's perspective. This customer-centricity allows to develop a business innovation and business model that is tailored to the customer's needs and drivers, thereby increasing the chances of success (Schwaferts, 2023, p. 193-195). In particular, the innovation solution should be challenged at any stage of the development process. In this section, we will thus first identify the different customer segments in career counseling, and then further elaborate a persona for one of the customer segments. A persona is a fictional character that represents a customer segment and their specific needs and drivers.

Career counseling can be provided to a wide range of different clients. Especially, clients may be in different stages of their career. A client may be in the process of finishing school or university and about to enter the job market. Another client might already have several years of work experience and looking to optimize his or her career. A third client may be in the process of re-entering the job market after a period of absence, such as unemployment or a parental leave. Due to these totally different *life circumstances*, the customer perspectives might be entirely different. Considering the Maslow pyramid of needs (Maslow, 1943), a client in the process of re-entering the job market might be more concerned with basic physiological and psychological needs (such as securing access to food and shelter) than a client who has an established career and is seeking a career optimization. The latter might be more concerned with the higher-level needs of esteem and self-actualization. Although we will subsequently only develop a persona for one customer segment, we nevertheless want to shed light on the individual needs of these three client archetypes.

Figure 2: Future state of a true digital ecosystem built around LinkedIn on top of a new CCaaS API layer. Counselors and start-ups join the digital ecosystem and participate in the value creation (own illustration).



2.1 Job Market Entry

Graduates and other job market entrants are often faced with the challenge of finding a suitable job. As they do not have previous work experience (or just a little), they face challenges in finding a job that matches with their education, skills and interests. They often lack the necessary knowledge to successfully apply for a job. Job market entrants may also lack knowledge about the employer or its industry potentially leading to a mismatch between the entrant's expectations and the reality of the job.

Needs:

- *personalized* advice and coaching
- covering basic needs by generating sufficient income from employment
- information on the job market
- information on the application process
- assessment of skills, interests and cultural & ethical values
- job recommendations matching with education, skills, interests and cultural & ethical values
- assistance in preparing the CV and writing a cover letter
- coaching for job interviews

2.2 Career Transition

Professionals with a few years of work experience may be looking to optimize or change their career by either transitioning into a new role with more responsibility, by changing into another industry, or by choosing a new career path. They may be looking for a new role in order to grow and advance their career. Others may be unsatisfied with their current job, career advancement prospects, or industry and hence looking to change their career path entirely. This customer segment is different from the job market entrants, as they have already gained some work experience and have a better understanding of their skills, interests and values. Further, the focus is on psychological safety and self-actualization, as the basic needs are already met. However, transitioning to a new role or new career path may also pose significant risks. The career move may turn out differently than expected, and the new role or career path may not be a good fit. This may lead to a loss of self-esteem, confidence and motivation. In the worst case, this could translate to lower job performance, a loss of the job and hence of income.

Needs:

- *personalized* advice and coaching
- high safety in the career transition, e.g., by choosing industry and career path transitions that are common and typically successful
- keep skills up-to-date with the latest development (e.g., new skills needed due to AI)
- development of a personal career plan
- assessment of skills gaps and development of a plan to close these gaps
- assistance in job search, e.g., by providing matching job recommendations
- coaching relative to the new industry and role

2.3 Job Market Reintegration

Clients who are seeking reintegration into the job market may have been unemployed for various reasons and over different periods of time. They may have been unemployed for a short time, e.g., after a parental leave, or for a longer time, e.g., due to a layoff in an economic downturn. Also, they may have been working in a different country previously and following their spouse to a new country as part of an expatriation or international relocation. Whatever the reason and length of absence from the job market, this customer segment shares a common overarching need: they are looking to re-enter the job market and find a suitable job as quickly as possible—the longer the absence from the job market, the more difficult it gets to re-enter.

Needs:

- *personalized* advice and coaching
- covering basic needs through sufficient income from employment by re-entering the job market
- information on the current job market and job opportunities
- job recommendations matching with education, skills, interests and cultural & ethical values
- information on alternative career paths
- information on alternatives to employment, e.g., self-employment and entrepreneurship

2.4 Persona

In the following we elaborate the persona of Sarah, a recent graduate who is about to enter the job market. We will describe her background, goals, and needs in order to better understand her current perspective on career counseling. We will also think about how Sarah might use career counseling during the first few years of her career, i.e., as a *young professional*.

Sarah is a recent graduate who is feeling a mix of emotions as she prepares to enter the job market. She is excited about the opportunities that lie ahead but also nervous about the challenges she may face during this life transition. She values her cultural and ethical beliefs and seeks to find an employer that aligns with those values. Sarah wants her career to be a reflection of her principles and make a positive impact in the world, while also providing opportunities for personal and professional growth. Sarah is well-organized and thoughtful—she develops a career plan that spans the next five years with potential to grow into senior roles. She is hard-working and committed to put in the efforts needed to achieve her career goals.

Name: Sarah Gallardi

Age: 24

Family: Single, no children

Location: Zurich, Switzerland

Education: Tertiary, completed a Master's degree in Information Systems

Occupation: Completed graduate studies, about to enter the job market

Work Experience: 6-months internship, worked part-time as a teaching assistant during studies

Figure 3: Persona of Sarah Gallardi (own illustration; photo by JodyHongFilms on Unsplash).



Sarah Gallardi

Age 24

Occupation Completed graduate studies, about to enter the job market

Education Tertiary

Income Lower middle-class

Sarah is a recent graduate who is feeling a mix of emotions as she prepares to enter the job market.

She is excited about the opportunities that lie ahead but also nervous about the challenges she may face during this transition in her life.

She values her cultural and ethical beliefs and seeks to find an employer and industry that align with those values.

Sarah wants her career to be a reflection of her principles and make a positive impact in the world, while also providing opportunities for personal and professional growth.

Goals and Needs: Sarah has a number of goals and needs that she wants to achieve and where career counseling could be beneficial to her. These goals and needs are described in the following, while we try to analyze them in terms of intrinsic and extrinsic motivation and the hierarchy of needs.

- **Personal advice:** Foremost, Sarah wants to receive personalized advice and coaching. She wants to discuss her career goals and plans with a professional career counselor. In particular, she wants to learn what career paths are available to her and how she can best achieve her career goals. [extrinsic motivation, i.e., higher remuneration, career advancement]
- **Cultural and Ethical Alignment:** Sarah places a high value on cultural and ethical alignment with potential employers and industries. She would not want to work in an industry that exploits workers (such as some mining companies), or in the fossil fuels, tobacco or armament industries. She dreams of working for a company that promotes diversity, inclusion, equality and respects different perspectives and cultures. [intrinsic motivation, self-esteem, belonging, self-actualization]
- **Sustainable Practices:** One particular value Sarah cherishes is sustainability. She wants to work in an industry that is environmentally responsible and prioritizes sustainable practices. Through her commitment to sustainability, she hopes to contribute to a better world. [intrinsic motivation, self-esteem]
- **Work-Life Balance:** Sarah recognizes the importance of work-life balance in maintaining her well-being and overall satisfaction. She prefers employers and industries that prioritize a healthy work-life balance, offer flexible working arrangements, and support employee well-being initiatives. [intrinsic, self-actualization]
- **Learning and Development:** Sarah wants to be challenged in her job, and she seeks continuous learning and development. She values organizations that provide opportunities and career paths for professional growth, such as through training programs, mentorships, and support for employees' career advancement. [extrinsic, i.e., higher remuneration through career advancement and intrinsic, i.e., self-esteem and self-actualization]
- **Job Security:** Like many white collar workers, Sarah is very worried due to the rapid raise of AI technologies. Is her education still going to be relevant in five years from now? Will she be replaced by a robot? She wants to find a job that is future-proof and where she can build a long-term career. [extrinsic, i.e., basic needs, safety]

Summary: Overall, Sarah wants to find an employer and industry that not only align with her cultural and ethical values but also provide opportunities for personal and professional growth. She aspires to contribute to a sustainable, socially responsible, and inclusive work environment where she can make a positive impact for the world while also thriving in her career. Considering Maslow's hierarchy of needs, Sarah is currently in the process of fulfilling her basic needs by seeking an employment that will secure food, shelter, etc. through the stable remuneration. However, she also has higher aspirations: she strives to fulfill her needs relating to self-esteem, belongingness, and morality. The right job with the right employer will provide her with a sense of belonging and self-esteem. She wants to feel valued and appreciated for her contributions, while being able to advance her career within a few years. Finally, aligning her cultural and ethical values with her career choices will allow her to partly fulfill her self-actualization needs.

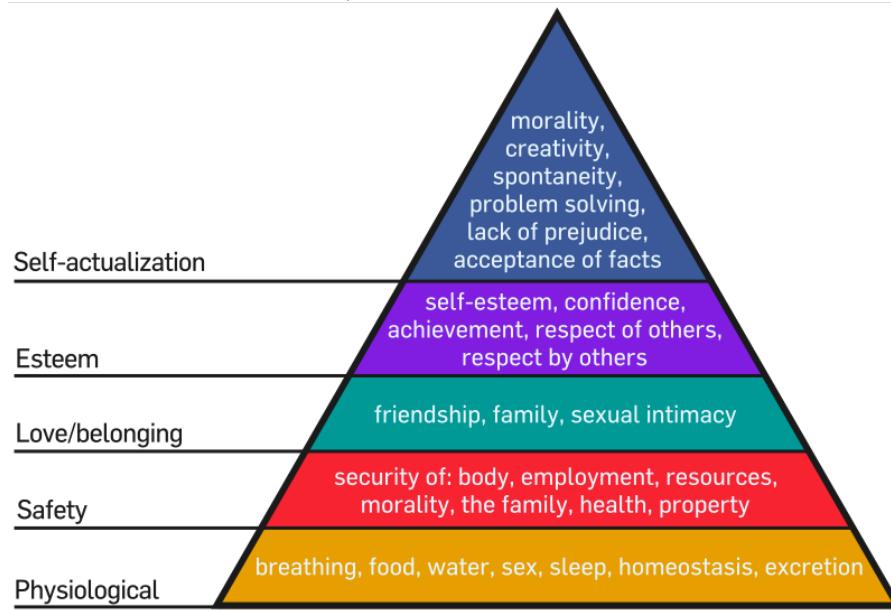
2.5 Drivers and the Environment

Drivers are the set of intrinsic and extrinsic motivators that ultimately drive the behavior of our customers. These are the deeply-rooted, sometimes unconscious, causes and the true source of the customer's needs. Understanding these drivers can help us to conceptualize innovative solutions and business models that are more likely to succeed due to the customer-centricity and acceptance. We will first introduce human drivers that we derive from Maslow's hierarchy of needs Maslow (1943) and then discuss customer drivers that are more specific to our customer segments.

2.5.1 Human Drivers

Based on Maslow's hierarchy of needs Maslow (1943), we can derive a set of human drivers that are common to all humans. These drivers are the fundamental motivators that drive human behavior and are therefore important to consider when designing solutions and business models in career counseling. The needs that are lower in the hierarchy are more fundamental and must be fulfilled before the higher-level needs. Figure 4 illustrates the hierarchy of needs with examples of specific needs for each level of the pyramid. In terms of career counseling, we can identify basic physiological needs, such as food and shelter, as well as safety needs, such as job security, financial security and access to health services as the basic human drivers. Humans strive for employment to earn an income that helps them to cover their basic physiological needs. Career counseling can guide them to achieve more safety through a stable employment, career development perspectives leading to increased responsibility and better paid jobs, thereby increasing income and financial security.

Figure 4: Human drivers according to Maslow's hierarchy of needs Maslow (1943) (reproduced from Wikimedia Commons under CC-BY license).



2.5.2 Customer Drivers

On a higher level of the Maslow pyramid, we can identify a number of customer drivers that guide customers in terms of demand for career counseling services. These drivers are more specific to our customer segments and are therefore highly relevant when designing innovative solutions and business

models in career counseling. Based on the persona introduced in the previous section, we can identify several customer drivers related to belongingness, self-esteem and even to self-actualization. A career generates feeling of belongingness by actively participating in the society and work environment. The goal of a career plan is to advance in life to reach higher-level goals. Through career advancement, customers achieve higher incomes, reach higher social status, gain more recognition and progressively build self-confidence and self-esteem. Through an advancement in career, customers are also in a better position to choose employers and industries they see better fit with their own beliefs and values. This cultural and ethical alignments allows them to fulfill their self-actualization needs by better exploiting their full potential. In the case of our persona Sarah, this would translate to her ability to contribute to a better world through working, e.g., in a sustainable industry.

2.5.3 *Perception of the Environment*

To fully understand the expectations of a potential customer, we also need to consider how the person perceives its environment (Schwaferts, 2023, p. 194). Besides drivers introduced previously, the true needs of a person may be rooted elsewhere. The persona we introduced is at a stepping stone in her life. Thus, she might be anxious to make a wrong career choice that will affect her for the rest of her life. She is thus highly attentive to her environment. Her current environment consists of the university and student life, friends and family. Sarah is also attentive to political and societal changes, such as a drive more for gender equality. With rapid progress of AI, she might however also be hostile to technological progress. She might perceive it as a threat to her own career that she could be replaced by AI some day. When designing CCaaS services we can account for this perception of a potential threat by involving humans into the AI decision-making processes instead of attempting to fully automate tasks that are traditionally performed by humans.

2.5.4 *Self-Presentation in the Environment*

Equally important is how the person presents itself to the environment. Our persona Sarah is highly educated and has high ethical and moral standards. As such, she wants to present herself as a highly capable and morally integer person. When designing CCaaS services we can account for such ethical and cultural values that are central to a person. For example, the CCaaS can recommend employers and industries that are aligned with the person's values. This can be achieved by analyzing the job descriptions and company profiles for keywords that are relevant to the person's values.

2.6 **Value Proposition**

The value proposition of a business represents the value that is expected to be generated and delivered to the customer. It can also be described as the unique selling proposition. Tools like the value proposition canvas, which was introduced by Osterwalder et al. (2014), can help entrepreneurs design effective value propositions. However, the value proposition canvas may not fit very well for the business model of digital platforms, where value is co-created by different stakeholders and the operator is not in control of the transactions between different stakeholders of the platform (Belleflamme & Neysen, 2021). Because of the value co-creation and lack of transactional control, so they continue to argue, it is not clear to whom the value proposition should specifically be addressed to. Counseling clients are not interested in the matchmaking and recommendation infrastructure of the platform, but rather in the value that is created by the other users (e.g., counselors) and insights from the aggregate data of other users (e.g., career paths). To help digital platforms design effective value propositions, Belleflamme and Neysen (2021) proposed the Multisided Value Proposition Canvas (MVPC). Based on the platform aspect of CCaaS we

will thus analyze the customer side based on the perspective of career counseling clients, but stick to the well-established canvas introduced by Osterwalder et al. (2014). We consider these counseling clients as the ultimate beneficiaries of the value proposition. Figure 5 summarizes the customer side of the canvas. In the following we elaborate on the customer jobs that customers are trying to get done via career counseling services, the pains they experience, and the potential gains that they are seeking (but that may not be delivered by current offerings).

2.6.1 *Customer Jobs*

Customer jobs represent the tasks that customers are trying to get done as part of career counseling.

- Find a job that matches with education, skills, culture and ethical values
- Learn skills that are relevant in the job market and future-proof
- Grow on a personal and professional level
- Achieve rapid career advancement
- Steadily increase role and responsibility
- Steadily increase income
- Successfully navigate career changes

2.6.2 *Pains*

Pains represent the negative emotions, costs, and risks that customers are regularly experiencing before or during getting their customer jobs done within career counseling.

- Career counseling is expensive
- Career counselors have only limited time to spend with each customer
- Based on limited previous experience, some career counselors may not be able to provide good advice based on the customer's individual profile (a single counselor may have only seen a limited amount of similar cases and career transitions to provide effective advice)

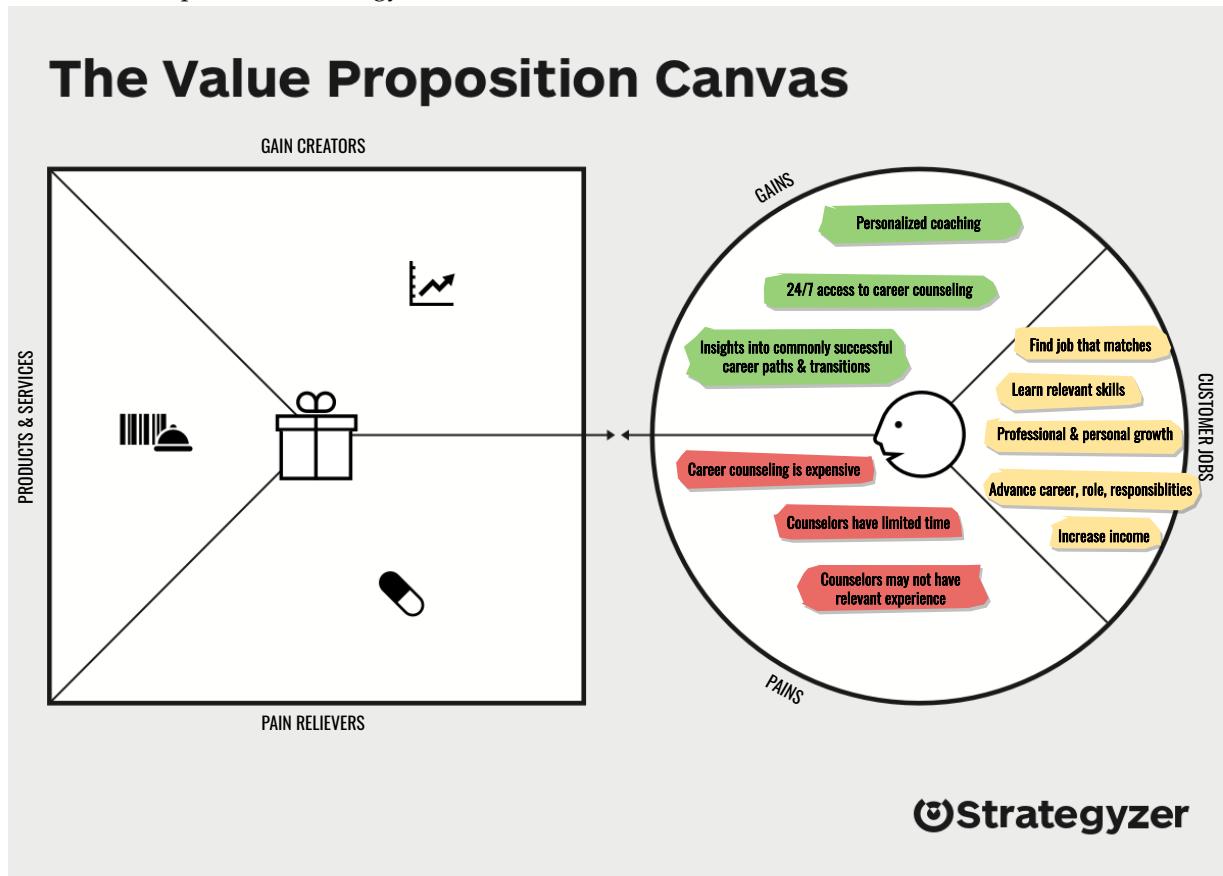
2.6.3 *Gains*

Gains represent the benefits that customers would wish from career counseling services but are typically not part of the current offering.

- Truly personalized coaching and career planning
- Insights into common career paths and career transitions given the customer's profile
- 24/7 access to career counseling

In Section 3 we will introduce the value proposition canvas and enablers from the side of the innovating company, i.e., LinkedIn.

Figure 5: The customer side of the Value Proposition Canvas for career counseling services (background illustration adapted from Strategyzer.com).



3 Enablers

This section describes the enablers, which are the prerequisites that the innovating company, i.e., LinkedIn, brings to the table and that must match with the customer perspective that we introduced in the previous section. Enablers can be based on the uniqueness of the company (i.e., its offering can not easily be copied by competitors) or on operational excellence (i.e., the company is able to provide its offering at a significantly lower cost than its competitors). The enablers are added to the company-side of the *Value Proposition Canvas* (Osterwalder et al., 2014).

3.1 Uniqueness

LinkedIn can provide a new service, i.e., *Career Counseling as a Service* (CCaaS), based on its unique position in the market, its broad access to career and job data, and access to state-of-the-art AI technology and machine learning algorithms.

3.1.1 Market Position

LinkedIn is the world's largest professional network with more than 900 million members in over 200 countries worldwide (LinkedIn, 2023). LinkedIn has a unique position in the market, see e.g., 99firms (2023); Käser et al. (2023):

- LinkedIn's user base encompasses 900 million users (January 2023)
- LinkedIn is used by 49 million users weekly
- 365 million users have skills data on their profile (44% of jobs filled with LinkedIn already use skills data as part of the recruiting)
- 50 million job searches per week (the widest reach in many Western countries)

3.1.2 Access to Data

LinkedIn is one of very few companies that has access to the data of such a massive user base, including very granular data on users' education, work experience, skills, and interests. LinkedIn also has access to data on companies and their organizational structures, job advertisements, and hiring practices. This data is a valuable resource for LinkedIn and can be used to train AI-based tools, e.g., job recommendation systems, career path recommendation systems, and career counseling systems. Due to the combination of the larger amount of data and more granular data, LinkedIn is in a unique position to train better AI algorithms than its competitors. Another less obvious data advantage is the graph structure of the data in LinkedIn, where users are connected to other users, to companies via work experiences, and to schools via education. This graph structure can be used to train graph-based machine learning algorithms that can provide better recommendations than traditional machine learning algorithms due to overcoming data sparsity and cold start problems (Zhang, Liu, & Gulla, 2023).

3.1.3 Access to Technology and AI

LinkedIn is part of Microsoft, one of the world's largest technology companies. Microsoft has invested heavily in artificial intelligence (AI) and machine learning (ML) in recent years, including owning a stake in the hottest of the AI companies, i.e., OpenAI (OpenAI, 2023). Microsoft also owns GitHub and has already proved that it can successfully integrate one of its companies with the offerings from OpenAI. In particular, Microsoft and OpenAI have jointly developed GitHub Copilot, an AI-based code assistant that helps developers to write better code, leveraging the huge database of GitHub and the AI know-how from OpenAI (Novet, 2021). LinkedIn has similarly access to Microsoft's and OpenAI's AI and ML technologies.

3.2 Operational Excellence

3.2.1 Master of Scale

LinkedIn has successfully mastered scaling challenges in the past, including a phase of hypergrowth. As a result LinkedIn has a proven track record in architecting scalable software systems based on a microservices approach (LinkedIn, 2015).

3.2.2 Master of Speed

LinkedIn suffered major architectural challenges after its IPO. Subsequently, LinkedIn engineering teams mastered a revamp of its systems architecture and developer tooling, putting them ahead of competitors in terms of speed of experimenting, iterating and new feature delivery (Vance, 2013).

3.2.3 Master of Cost

Floerecke (2018) researched success factors for software-as-a-service (SaaS) business models and found the main one to be that "*SaaS service[s] should be developed as a system comprising modular microservices in order to meet the desired requirements in terms of cost advantages, performance and scalability*". Accordingly,

CCaaS should be designed as a system of modular microservices that are offered via an API layer. Further, adoption by career counselors can be facilitated via a marketplace for career counselors and low/no-code solutions. This allows for leveraging CCaaS services without fully, costly technical integration of the API.

3.3 Products & Services

The services provided as part of CCaaS can be offered as a bundle or individually. Based on the microservices approach, the counseling service providers can choose which API endpoints they want to use and integrate into their offerings. LinkedIn's CCaaS offering should encompass the following services:

- **AI Models:** Build and offer the AI models for career counseling based on the data that LinkedIn has access to, including user profiles, skills, educations, job postings, and feedback data from career counselors participating in CCaaS.
- **API Layer:** Provide all CCaaS services as reliable, highly available, and scalable API endpoints.
- **Career Counselor Matchmaking:** Matchmaking between career counselors and the clients based on their user profile data, the counselors' past customers, geographic proximity, and other factors.
- **Skills Assessment:** Skills assessment based on user profile data from LinkedIn, including gap analysis.
- **Job Search & Recommender:** Search and recommend jobs based on similarity with the user's profile leveraging word embeddings and graph embeddings.
- **Writing Assistant:** Provide a writing assistant for preparing CVs and cover letters for job applications using generative AI tools.
- **Career Path Recommender:** Recommend career paths based on the similarity of the user's profile and similar users' career paths leveraging graph embeddings.
- **Training Recommender:** Recommend trainings to a user based on profile and chosen career path (help user fill skill gaps required for career path).

3.4 Gain Creators

Gain creators describe how the products and services of a company create gains for the customer. In the case of CCaaS, the gain creators are the services that are provided (via the career counselors) to the end customers like Sarah. Gain creator should match the gains introduced in the customer perspective.

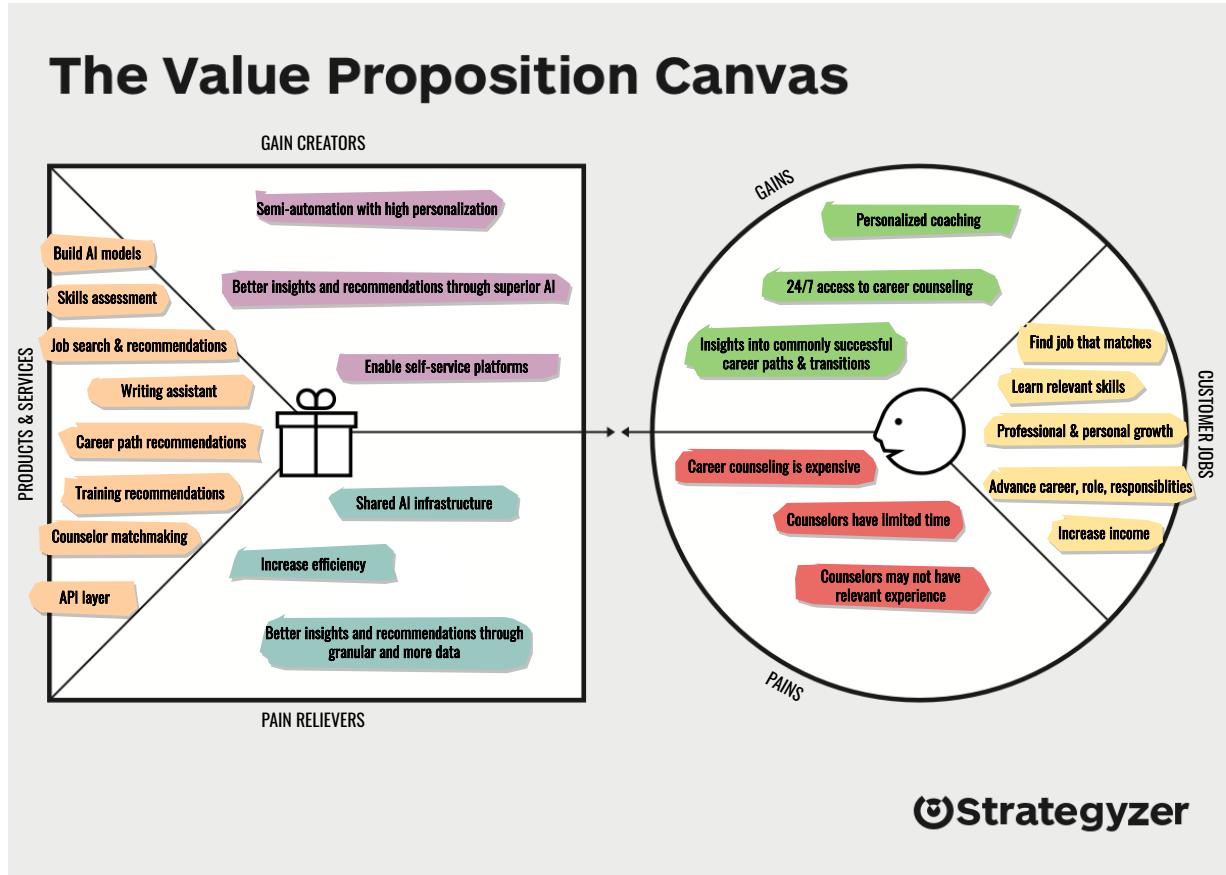
- Enable career counselors to provide semi-automated but highly personalized career counseling
- Provide insights and better recommendations for career paths, jobs, and trainings through superior AI models
- Enable self-service career counseling platforms

3.5 Pain Relievers

Similarly to gain creators, pain relievers describe how the products and services of a company relieve the pains that are experienced by the customers.

- Reduce costs by shared AI models and shared infrastructure
- Increase efficiency in career counseling
- Provide better insights and recommendations through broader and more granular data

Figure 6: The full Value Proposition Canvas with customer- and company side (background illustration adapted from Strategyzer.com).



3.6 Customer Centricity: Addressing Customer Needs

By combining the customer-side and the company-side of the value proposition canvas, we can identify the services that relate to customer jobs via either gains and gain creators or pains and pain relievers. This is illustrated in Figure 6. Table 1 summarizes how the services connect with the customer jobs and thus ensure a high customer-centricity of the business model that we will develop in the next section. Some common gains and pains and matching gain creators and pain relievers are listed as part of the jobs to be done.

3.7 Value Co-Creation Through Collaboration

According to Grieder and Schwaferts (2019), most companies are still working on management theories and principles that were developed in the industrial age. They continue to argue that in the digital age, companies should join a digital ecosystem where value is co-created through collaboration of different participants. In the following we develop how value is co-created in the AI-based career counseling ecosystem with LinkedIn's CCaaS as an important component.

The direct customers of LinkedIn's new CCaaS service will be independent career counselors, counseling companies, counselors at educational institutions and job centers. Further, new start-up companies may emerge taking advantage of the CCaaS API and potentially combining it with other offerings, such as

Table 1: Connecting customer jobs with services via gains / gain creators and pain / pain relievers.

| Customer Job | Gains / Pains | Creators / Relievers | Services |
|--------------------------------------|---|---|--|
| Find job that matches | Counselor may not have relevant experience | Better insights through more & granular data | Job search & recommendations; writing assistant for CV and cover letter |
| Learn relevant skills | Insights into commonly successful career paths | Better insights through superior AI | Skills assessment; training recommendations; career path recommendations |
| Professional & personal growth | Personalized coaching | Semi-automation with high personalization | Job recommendations; training recommendations; career path recommendations |
| Advance career, responsibility, role | Personalized coaching | Better insights through superior AI; better insights through more & granular data | Counselor recommendations; career path recommendations; training recommendations |
| Increase income | Career counseling is expensive; counselors have limited time; 24/7 access to counseling | Self-service platform; increase efficiency; shared AI infrastructure | Counselor recommendations; career path recommendations |

integrating with assessment platforms or learning platforms (Coursera, Udemy, etc.). However, the end customers of the CCaaS service are the clients of the counselors that we introduced in the customer perspective. As LinkedIn is not specialized in career counseling but is a social network that connects professionals, it is not its core business to provide career counseling. Therefore, LinkedIn needs to collaborate with these specialized counselors that can provide specialized career counseling services. Also, career counselors may work at different locations around the world. For instance, our persona Sarah may wish to receive personal career coaching on-site at her university in Zurich. The combination of the CCaaS offering and counselors specialized knowledge, experience and geographical distribution will provide the end customers with a unique value proposition that is not available today, with LinkedIn and its CCaaS offering at the center of the value co-creation network.

LinkedIn sits atop a mountain of valuable career data from its 900+ million members. Its contribution to the value creation is to provide highly specialized, machine learning based services. For instance, LinkedIn can provide a service that recommends career counselors to its members based on their profile data. Career counselors can access machine learning based recommendations of career paths for their clients using the CCaaS API layer. LinkedIn could design the CCaaS API layer in a way that career counselors could actively or passively leave feedback on the job recommendations and career path recommendations provided by LinkedIn, thereby helping LinkedIn to collect additional, refined data which are useful to further improve its machine learning models. Both, LinkedIn and career counselors, thereby actively contribute to a higher value creation for the clients that was not possible before. The CCaaS API layer presents a *win-win-win* situation for all three engaged parties: LinkedIn, the counselors and the counseling clients.

In Section 4, we will develop a business model for LinkedIn's CCaaS offering.

4 Business Model

In this section we develop the business model of the CCaaS service offerings. To this end we are using an adapted version of the Business Model Canvas originally by Osterwalder et al. (2010). The Business Model Canvas was developed around 2008 and is not suited for the digital age and value propositions that originate in a digital ecosystem (Schwaferts, 2023, p. 193-210). The adjusted framework by Schwaferts (2023) helps companies to develop business models for digital ecosystems. It is based on the same building blocks as the original Business Model Canvas, however, it starts with the customer perspective that we introduced in Section 2 to develop a value proposition for each customer segment that is deeply rooted in customer-centricity. Because in the digital age the value that is generated for the end customers may stem from several participants of the ecosystem, the adjusted canvas specifically also focuses on the value co-creation as well as the contribution of each player to the overall ecosystem value creation. Within the digital ecosystem the value contribution of different players can be seen as a sequence of value co-creation activities, which can be performed by different parties. Thus, the adjusted canvas also includes the reasoning on why a certain contribution comes from a participant and not from another. The uniqueness of a company in terms of its abilities to orchestrate key activities and key resources will dictate what contribution it can make to the ecosystem. Finally, the business model is evaluated in terms of its fit with the system using System-FIT Schwaferts (2020).

Figure 7 shows a graphical summary of the business model canvas. The value proposition developed in the previous two sections is inserted into the center of the canvas. In the following we develop the remaining building blocks of the canvas. The contribution of LinkedIn CCaaS to the ecosystem will be discussed later in Section 5. The System-FIT of the CCaaS business model is discussed in Section 7.

4.1 Customer Segments

As developed in Section 2, career counseling is used by three customer archetypes: new job market entrants, professionals in career transition, and unemployed seeking reintegration. However, the value proposition is similar for all three types, i.e. the service offerings are the same. Therefore, we can use a single customer segment (**counseling clients**) for all three customer archetypes.

4.2 Channels

Channels are the means by which the clients access the career counseling service offerings from LinkedIn. As LinkedIn will be the provider of CCaaS services, most channels will be operated by the intermediaries, i.e., counselors and counseling companies.

- **Web:** the CCaaS platform may be used to provide web services to customers. For example, a career counseling company may provide a web portal to its customers that uses the CCaaS API layer to retrieve job recommendations and career advice for the customer. Also, LinkedIn can offer its own platform for users to find career counselors based on geographic location, expertise, etc.
- **Mobile:** the CCaaS platform may be used to provide mobile services to customers. For example, a career counseling company may provide a mobile app to its customers that uses the CCaaS API layer to retrieve job recommendations and career advice for the customer.

4.3 Customer Relationships

Customer relationships are the types of relationships that LinkedIn establishes with the career counseling clients. Based on the platform argument introduced in Section 2, the relationship may not be a direct one (i.e., between LinkedIn and the customer segment). Instead, the customers have a relationship with a career counselor (or a counseling company) that uses the CCaaS API layer to render its counseling services.

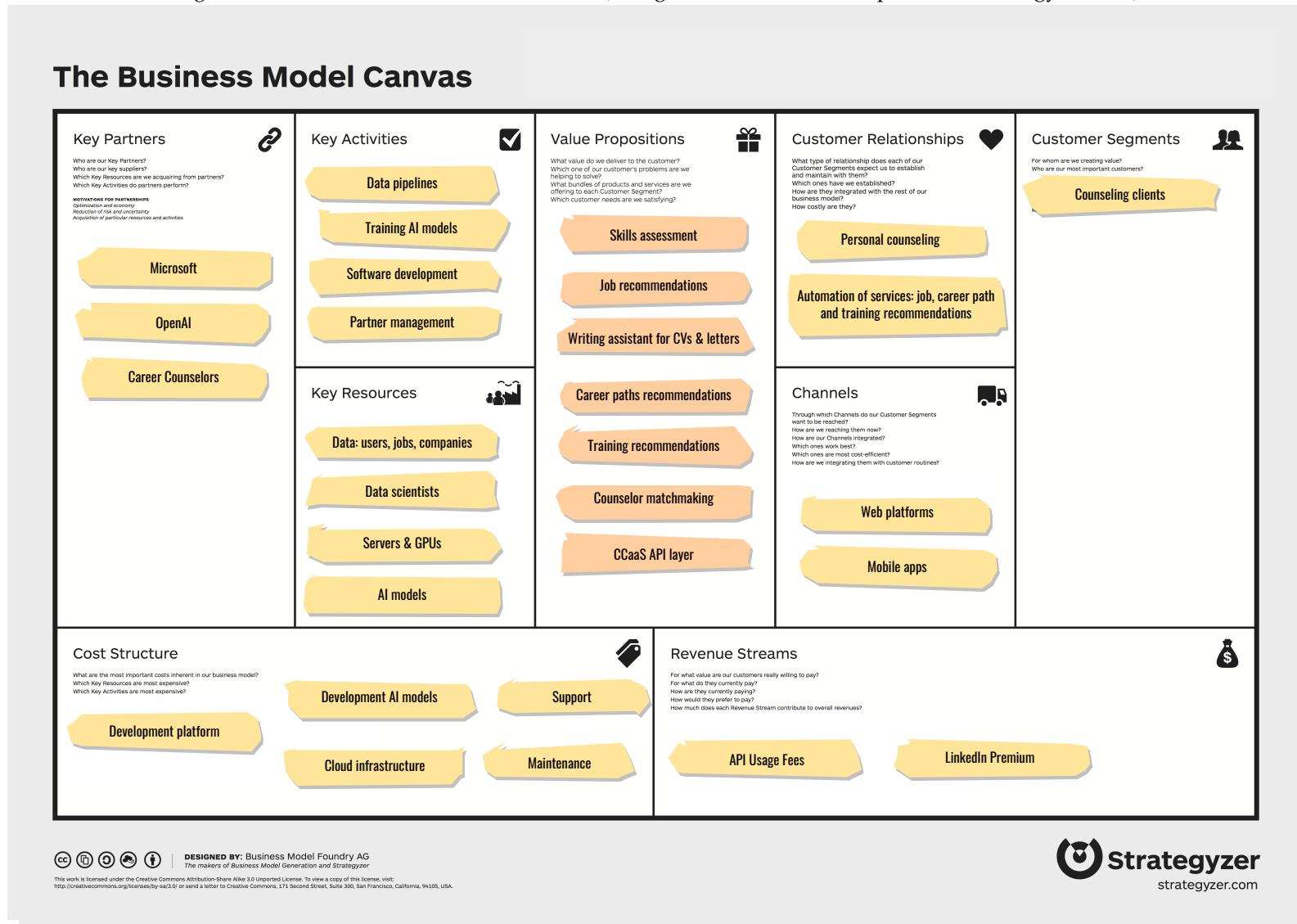
- **Personal assistance:** career counselors may individually follow a customer's case and provide personal advice. The CCaaS platform may be used to support the career counselor in his/her work by providing contextual recommendations and suggestions based on the current client being advised.
- **Automated services:** the service offerings are provided as automated services, i.e. the customer can use the service without the need for (a human) personal assistance. A counseling company may, e.g., automate the retrieving of job recommendations and career path suggestions for each client by using the CCaaS API layer and forward these recommendations to the client.

4.4 Key Activities

Key activities represent the important things that LinkedIn must do to make the CCaaS platform work and to offer the career counseling services via its API layer (ultimately enabling the counselors to render the value proposition to clients).

- **Data Pipelines:** LinkedIn needs to collect data from its users and store it in regular databases and graph databases. This activity includes designing the data model, architecting the data systems, developing the data pipelines, testing and deploying them, and monitoring and maintaining them once in production. Additionally, data pipelines for feedback data from career counselors and users on recommendations need to be developed.
- **Training AI Models:** Similarly, LinkedIn needs to train AI models and recommender systems on the collected data. This activity includes designing, training and evaluating artificial neural networks (ANN), architecting the AI systems, testing and deploying AI models, and monitoring and maintaining them once in production. Feedback data from career counselors and users on recommendations need to be used to re-train and fine-tune the AI models used for recommender engines.
- **Software Development:** LinkedIn needs to develop the CCaaS API layer and integrate it into the existing LinkedIn platform and services. This activity includes designing, developing, testing, deploying and documenting the API layer.
- **Partnership Management and Support:** LinkedIn needs to manage its partnerships with career counseling companies and technology partners. This activity includes onboarding of new partners to the CCaaS platform, technical consulting regarding the integration of the CCaaS API layer, and support.

Figure 7: Business Model Canvas for CCaaS (background illustration adapted from Strategyzer.com).



4.5 Key Resources

Key resources describe the most important tangible assets required to make the business model work. These assets may not be owned by LinkedIn, but may be acquired from key partners.

- **Data:** First and foremost, LinkedIn's data on users, companies, and jobs is the most important asset for the CCaaS business model. The data is used to train effective AI models and recommender systems.
- **Data Scientists:** LinkedIn's (and by extension via Microsoft and OpenAI) data engineers and data scientists are a crucial asset for the CCaaS business model. They are responsible for designing data models, architecting and developing data pipelines, training and evaluating AI models and recommender systems, and monitoring and maintaining them once in production.
- **Servers and GPUs:** servers and GPU's are required for intensive computational tasks such as training the CCaaS AI models and recommender systems. GPU servers are also needed for running the services via the API, i.e., at inference time.
- **AI Models:** the design and architecture of AI models (artificial neural networks) and recommender systems that are used to provide personalized automation in the CCaaS business model.

4.6 Key Partnerships

Key partnerships are not just suppliers, but real partners of the digital ecosystem in terms of value co-creation and rendering the products and services to the end customers.

- **Microsoft:** access to the cloud data centers including GPU servers from Microsoft Azur.
- **Microsoft / OpenAI:** access to the most advanced AI technology and AI research from Microsoft and OpenAI. The AI models used in the CCaaS business model are co-developed by LinkedIn, Microsoft and OpenAI.
- **Career Counselors:** career counselors and counseling companies are the actual customers of LinkedIn CCaaS paying usage fees for the CCaaS API layer. However, they are also partners in terms of value co-creation and delivering the value to the end customers, i.e. the clients seeking career advice.

4.7 Cost Structure

The cost structure describes the most important costs incurred by LinkedIn to operate the CCaaS business model:

- **Development:** the initial development of the CCaaS API layer and its integration into the existing LinkedIn platform and services (one-time fixed cost).
- **Data Science:** the development, deployment and maintenance of machine learning models and recommender systems used by the CCaaS platform (recurring costs, mostly salaries of data scientists and MLOps engineers).
- **Cloud Infrastructure:** the cloud infrastructure and bandwidth / traffic costs relating to the CCaaS platform (recurring, variable costs that depend on the API usage).
- **Support:** onboarding of career counseling companies and technology partners to the CCaaS platform, including technical onboarding and consulting.
- **Maintenance:** the maintenance of the CCaaS platform.

4.8 Revenue Streams

Revenue streams describe the way LinkedIn makes money from the CCaaS business model. There is one main revenue stream from API usage. Further, CCaaS may boost LinkedIn Premium subscriptions.

- **API Usage Fees:** career counseling companies pay usage fees for the CCaaS API. The usage fees are based on the number of calls on the different API endpoints. The pricing may be varied by API endpoint type, such as the type of recommendation (e.g., retrieving job recommendations might be cheaper than retrieving career path suggestions).
- **LinkedIn Premium:** LinkedIn Premium is an existing product and represents a subscription tier for LinkedIn. It gives premium users access to advanced features. LinkedIn Premium can be made more attractive by embedding some CCaaS offerings into the premium tier. For example, Premium users may get access to the portal for finding a suitable career counselor.

In the following Section 5 we look at the contribution of the CCaaS business model.

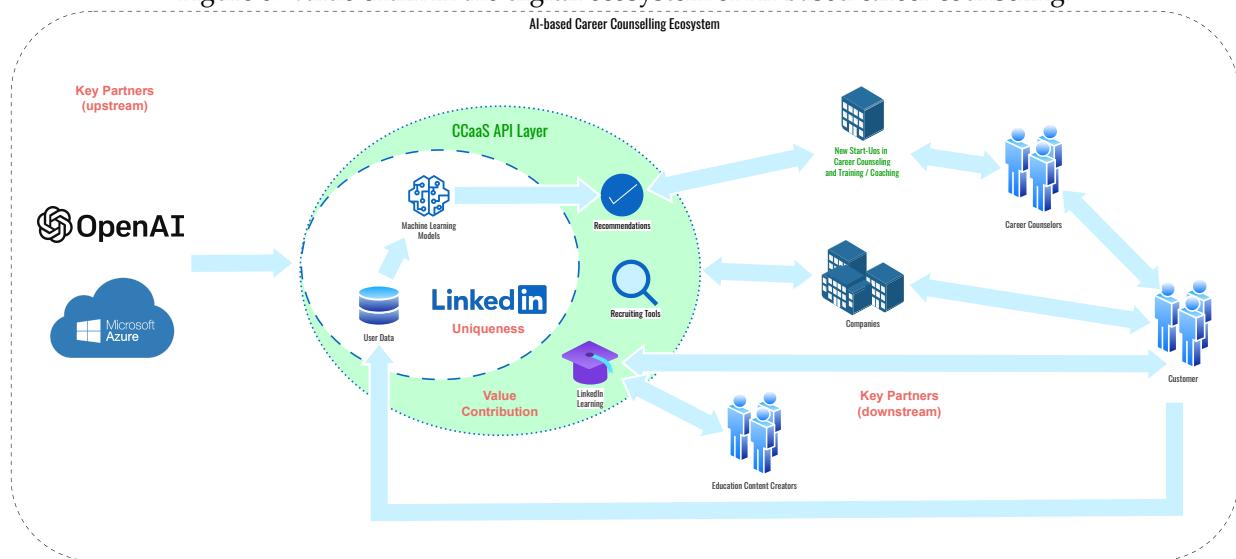
5 Contribution

In the following, we will describe the details of how the business model of CCaaS exactly works. We will first describe the contribution of CCaaS and the innovating company LinkedIn to the ecosystem, i.e., what is the contribution of LinkedIn, what is the uniqueness of the contribution and why is LinkedIn suited to orchestrate the activities and resources for the CCaaS (Schwaferts, 2023, p. 200-203). This is part of the assessment of the business model in the adjusted Business Model Canvas introduced in Section 4. We will then assess the novelty of the solution, before taking a closer look at the functionality, the pricing and the system architecture of the offering.

5.1 Value Chain and Contribution to the Ecosystem

The contribution of CCaaS to the ecosystem is the creation of a new digital ecosystem for AI-based career counseling. The uniqueness of CCaaS is mostly determined by access to data and access to machine learning technology. Because LinkedIn is in a “power play” position in terms of breadth and depth of data, it is uniquely positioned to offer such a service by leveraging on this data and AI technology. Career counselors are typically not in a position to leverage on such data and technology. However, they have the expertise to interpret the results of the AI models and to provide personalized services to the clients. As we have seen before, our persona of a career counselor is a highly educated person that could be anxious about the impact of AI on the job market. The counselors are thus an important piece in the value chain to deliver the value to the customer. Therefore, LinkedIn’s position is also limited and we can truly speak about a digital ecosystem (LinkedIn is not capable to deliver the counseling services on its own to the customer, as customer may not want fully automated services). Figure 8 shows the value chain in the digital ecosystem of AI-based career counseling.

Figure 8: Value chain in the digital ecosystem of AI-based career counseling.



5.2 Novelty

The idea of offering career counseling as online services is not novel. Neither is the idea of using AI models to assess a person’s skills and interests, or to recommend suitable jobs and training opportunities based on a user’s profile. In fact, 44% of jobs advertised on LinkedIn are already filled using skills data as part of the

recruitment process (Käser et al., 2023). This can typically be achieved by creating word embeddings of the job descriptions and the candidate's profile (i.e., converting both to vector space), and using a similarity measure between the vectors. Such vector similarity searches can even be implemented with off-the-shelf vector database software, such as Weaviate (Dilocker et al., 2023). However, the idea of offering a platform that provides career counseling as a service (CCaaS) is novel in several regards:

- The CCaaS business model encourages co-creation of value based on data from LinkedIn and personalized services from career counselors.
- Offering CCaaS via an API layer enables integration with existing career counseling services.
- The CCaaS API layer enables counselors to build their own applications on top of the platform.
- Using the CCaaS API layer career counseling companies are encouraged to use a mix-and-match approach, where they can choose to use the AI models provided by CCaaS, use their own AI models for certain use cases, or combine the CCaaS API services with services from other APIs (e.g., integrating the training recommendation service with a training provider's API such as Coursera).
- The CCaaS business model leverages on the unique database of LinkedIn to create the best AI models for career counseling, while encouraging feedback data from the community of counselors and clients to further improve the AI models.
- Heavy investments in training the AI models is shared across all users of the platform via the API usage fees.
- The CCaaS API approach could fuel further innovation by enabling third-party developers to build their own applications on top of the platform, including building applications for niche markets.

5.3 Customer Journey Design

Figure 9 shows the service blueprint for the customer journey of a job market entrant using career counseling via CCaaS. The service blueprint is a tool for service design that describes the customer journey in terms of user actions and was introduced by Shostack (1984). The service blueprint shows how the user actions connect to the frontstage, backstage, and internal support services. User interactions are the actual actions undertaken by the customer to request or consume the service, frontstage includes the visible touchpoints with the customer, while backstage includes the processes that are not visible to the customer but utilized to render the service to the customer. Finally, internal support services include the processes that are not visible to the customer and not directly involved in the service delivery, but are required to support the service delivery.

The customer journey starts with the job market entrant (i.e., client) matching with a counselor via the LinkedIn matchmaking web application. By choosing a counselor, the client automatically grants access to its LinkedIn user profile data via the CCaaS API. The counselor can then access the client's user profile data and start the actual counseling process. The counseling process consists of an assessment of skills and values, retrieving job recommendations, and helping the client choose the jobs to apply for using the profile data and leveraging on the CCaaS services API endpoints. The writing assistance service—which is embedded in the existing job application forms on LinkedIn—helps the client to write a better CV and application letters tailored to the advertised positions and the client's profile. Finally, clients and counselors can leave feedback on the recommendations and the counseling process via the LinkedIn matchmaking web application. This feedback data flows back into the AI model training process.

To understand the full extent of the CCaaS offering, we also need to look at the customer journey for a career transition. This customer journey aims at optimizing the career path of a client and starts with a renewed assessment (leaving the counselor matchmaking aside). Based on the assessment an optimal career path can be identified. However, the client may lack some skills or certifications to advance in this new career path. This calls for an additional service of training recommendations so that such skills gaps can be filled. Once the client has completed its additional training, the counselor and AI models can help the client to find suitable jobs in the new career path. Finally, counselors and clients can again leave feedback data for LinkedIn on the services and recommendations. Figure 10 shows the service blueprint for the customer journey of a career transition.

5.4 Pricing

The pricing model for CCaaS is based on a pay-per-use model, where the API usage is metered and charged to the counseling companies on a monthly basis. Each call on the API layer is logged via a message broker and a logging microservice (see Subsection 5.5). A separate microservice is connected with the billing and charging system of LinkedIn, and issues monthly bills to the counseling companies based on the effective API usage in that month. API requests can have different prices per request, depending on which API endpoint is used (i.e., what microservice is called). The pricing model is based on the value that the API endpoint provides to the counseling companies and the complexity of the AI models that are underlying the service. Table 2 shows the proposed pricing model.

Table 2: API usage pricing by CCaaS API endpoint.

| API Endpoint | Price | Proportion of Requests |
|------------------------------|-------------------------|------------------------|
| Retrieve user data | 1.00 USD p. user | 20% |
| Skills and values assessment | 3.00 USD p. assessment | 15% |
| Job recommendation | 0.25 USD p. job | 50% |
| Training recommendation | 0.50 USD p. training | 10% |
| Career path recommendation | 5.00 USD p. career path | 5% |

Figure 9: Service blueprint for the job market entry customer journey. Blue: LinkedIn, orange: counselors (own illustration).

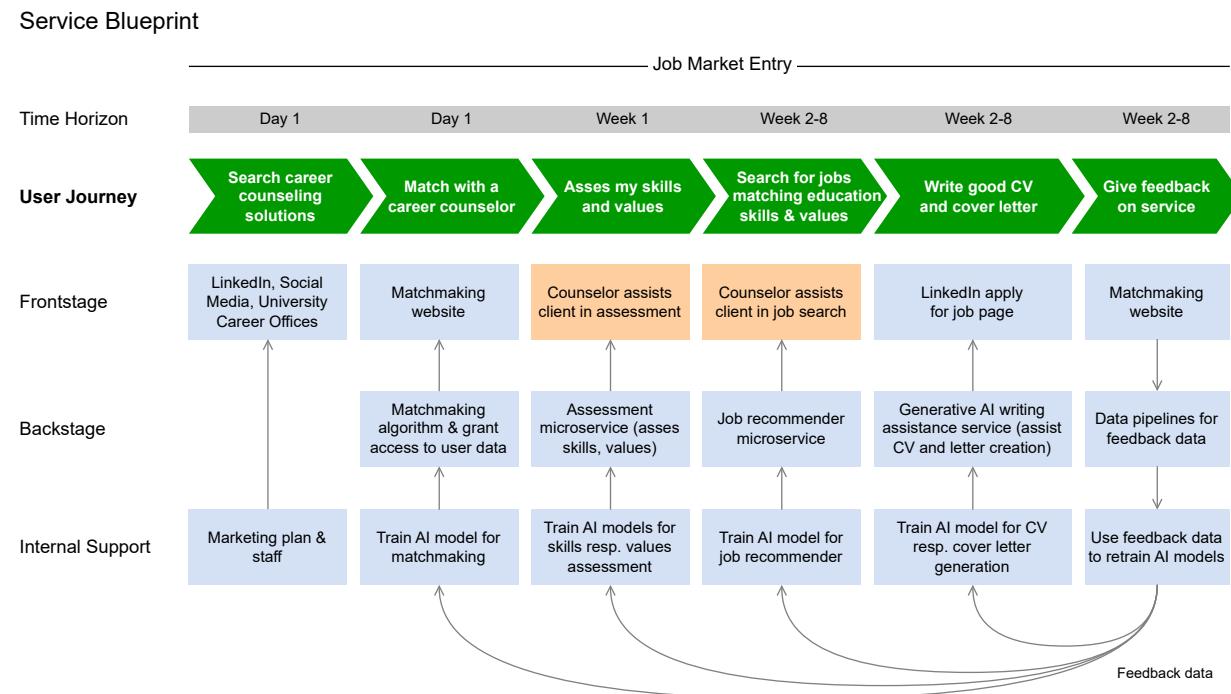
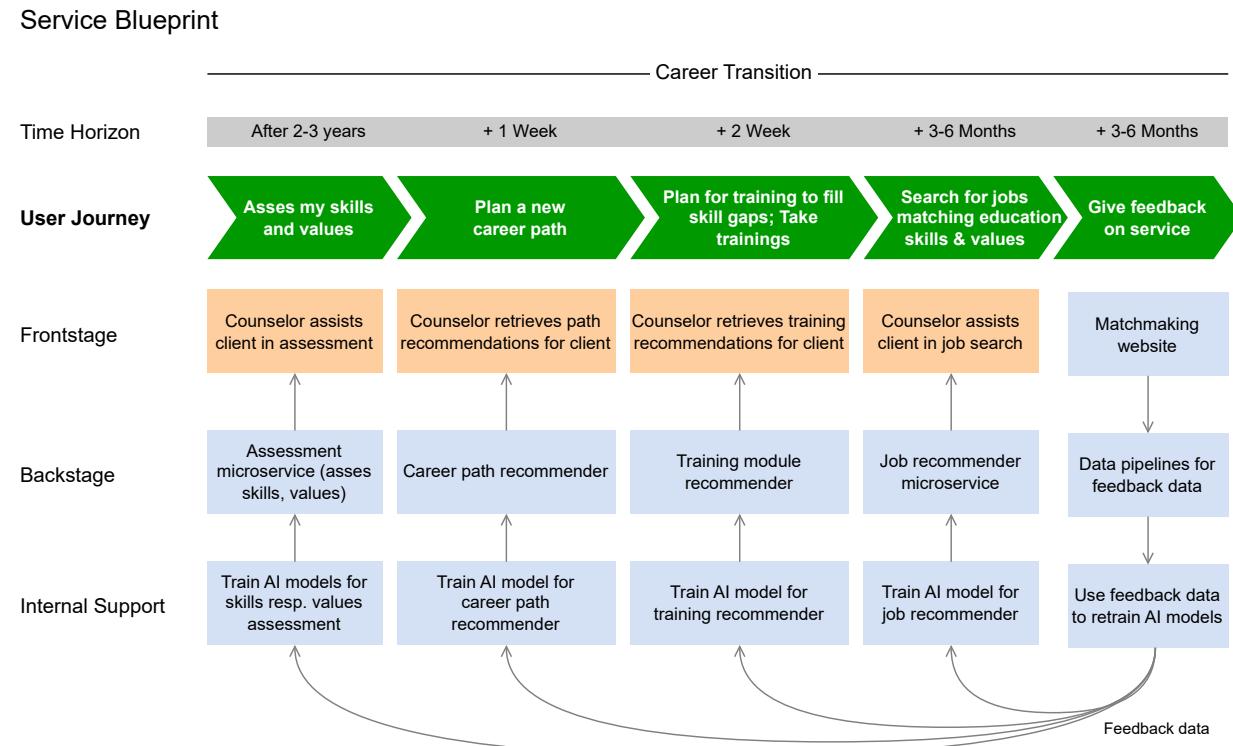


Figure 10: Service blueprint for the career transition customer journey. Blue: LinkedIn, orange: counselors (own illustration).



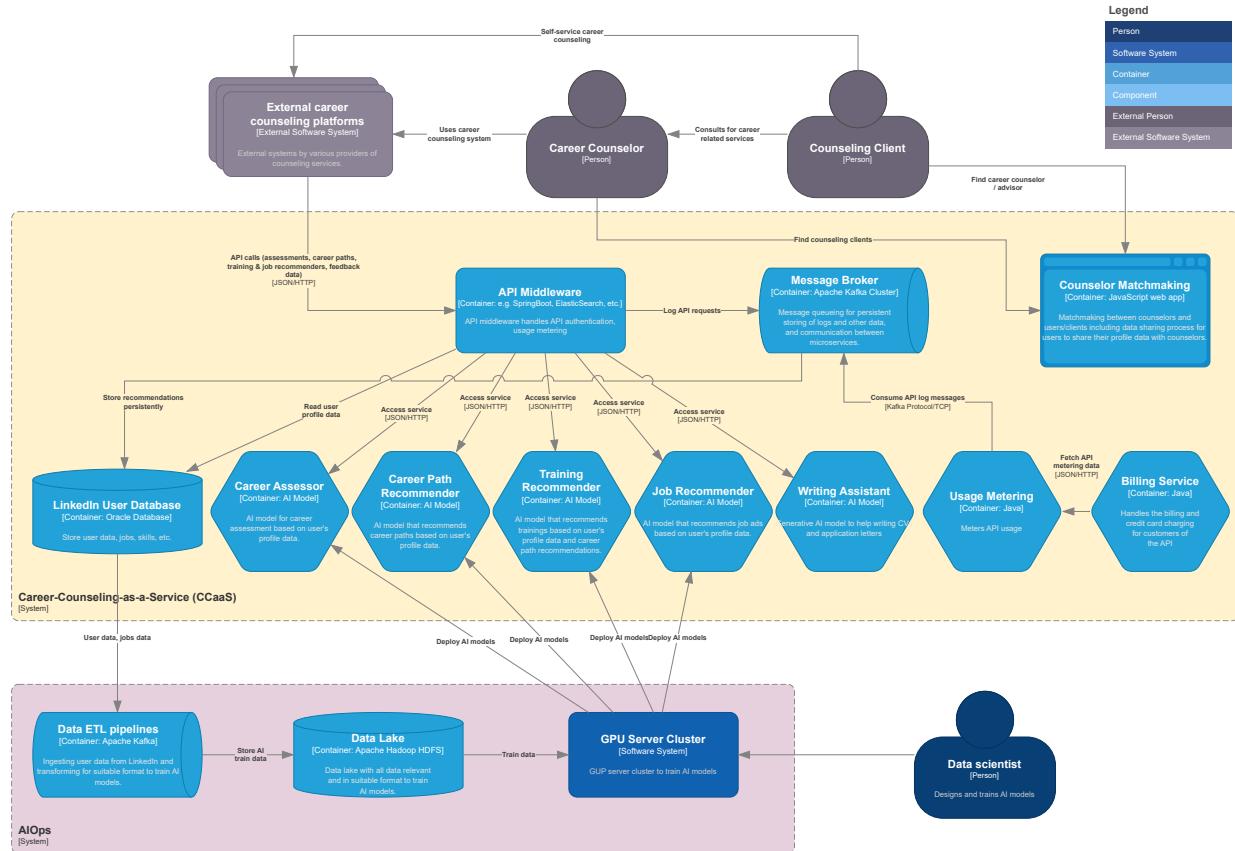
Based on the pricing and estimated usage proportion of each API endpoint, we can estimate the average price per API request to be 1.075 USD. Further, each market entry customer journey may bring revenues of 9.00 USD, considering that it may need 20 job recommendations in average. The writing assistance for CVs and application letters is free to use as it is not embedded in the CCaaS API but in the LinkedIn job application forms. The career transition customer journey may bring revenues of 15.50 USD, considering that it may need 5 training recommendations and 20 job recommendations in average. The market entry customer journey is expected to be used more often than the career transition customer journey, as the latter is only relevant for a subset of the market entry customers. The average revenue per customer journey is thus estimated to be 10.95 USD, considering 70% market entry customer journeys and 30% career transition customer journeys.

5.5 System Architecture

CCaaS is built as a series of microservices that each handle different types of recommendation tasks using narrow AI models specifically designed and trained for that task. The services are built along the lines of the core value proposition of CCaaS identified in Sections 3 & 4, namely providing career assessments, career path recommendations, training recommendations, job recommendations, and writing assistance for CVs and application letters. The microservices' architecture enables containers to be deployed and scaled independently. They are connected via a message broker that handles the communication between the services and persistent storage engines (e.g., to store newly created recommendations and log API requests). Two additional microservices are responsible for the metering of the API usage and the billing and charging of the API usage fees to the counseling companies. A web application serves as the gatekeeper between counselors and clients: clients can choose which counselors they want to work with (matchmaking) as well as grant access to their LinkedIn profile data to the chosen counselor, so that counselors can then subsequently access the client's data via the API and retrieve user-specific recommendations.

A separate system entails the data extraction, transformation and loading (ETL) pipelines that load and transforms user data and job data, and ingest them into a distributed large data storage layer (data lake). The data lake is used to provide large volumes of data in the right format that is required to train the AI models. Training of the AI models happens on a cluster of GPU servers. As introduced in the Section 4, the GPU server farm is provided by the parent company Microsoft via Azure cloud computing services. The trained models are then deployed to the microservices that are responsible for the actual recommendation tasks. The overall system architecture is shown in Figure 11 using the C4 modelling language for software architecture (Brown, 2010).

Figure 11: CCaaS system architecture in C4 Level 2 notation (own illustration).



6 Evaluation and Assessment

In the following, we assess the business model and the contribution of the CCaaS innovation. Through a multi-angled assessment, we can identify different types of contributions, risks and opportunities of CCaaS. Risks may render the innovation useless for the customer, financially unviable, or even illegal. As part of the assessment we can develop strategies to mitigate the identified risks, while being aware of the innovation's advantages enables to exploit opportunities fully.

6.1 Technical Feasibility and Considerations

According to Dornberger and Schwaferts (2021) technology can play two roles in the context of innovation and transformation: new technologies can be enablers of innovation ("digital innovation"), or technology can be required to implement business or management ideas, such as digital ecosystems ("digital business transformation"). In the case of CCaaS, we have technology as enabler, i.e., progress in computational power has fueled a renaissance of sub-symbolic AI and deep learning in particular. On the other hand, technology—such as shared cloud computing infrastructure—has brought costs down and makes it possible to viably offer new business models based on AI, thereby enabling digital business transformation.

The CCaaS business model builds upon the availability of large amounts of user data and data science know-how. The following technical aspects are particularly relevant in relation to career counseling as CCaaS offering:

- **Data:** LinkedIn already has one of the largest—if not the largest—user database on education, work experience, skills, companies and jobs. In particular, LinkedIn has collected verifiable information on the skills of its users: user can add skills to their profile and verify these skills by taking skill assessments quizzes (Käser et al., 2023). Users that pass the quiz are awarded a skills badge that is displayed on their profile page.
- **Data Science:** The CCaaS platform will use AI models to provide recommendations for trainings and career paths. Through its parent company Microsoft, LinkedIn has access to computational resources and highly skilled data scientists and AI researchers. Further, Microsoft owns a considerable stake in OpenAI, the creator of ChatGPT, DALL-E, and other state-of-the-art AI models.
- **Cloud Computing:** Access to computational resources is a key requirement for training AI models and running them in production. Through its parent company Microsoft, LinkedIn has access to massive cloud computing resources, including GPUs from Microsoft Azure. Further, technical progress such as quantum computing may unleash manyfold more powerful computation with much lower energy requirements in the near future.

6.2 Economic Viability

As a digital product, production costs for a "unit" of CCaaS (e.g., a single job recommendation) are near zero. The main cost factor is an initial investment in infrastructure, data science know-how, and training AI models. This is followed by ongoing costs for maintenance and further development of the AI models and scaling of the infrastructure. Thus, the CCaaS business model is characterized by high fixed costs and low variable costs. This means that the offering needs to reach a certain scale to break-even. However, beyond this tipping point the business model is extremely profitable. In the following we try to roughly estimate the fixed costs to calculate the break-even point based on the pricing scheme of the API introduced previously.

We estimate the fixed costs of training each AI model to be in the range of 500,000 to 1,000,000 USD. This includes the salaries for data scientists, the costs of building the data pipelines, and the costs for computational resources (GPUs). Based on the system architecture there are 5 AI models to train, which results in a total initial investment of 2.5 to 5 million USD. Further, we estimate the ongoing costs for maintenance and further development of the AI models to be in the range of 200,000 to 500,000 USD per AI model and per year. This includes the salaries for data scientists and the costs for computational resources (GPU). Further to AI models, we previously identified the following cost structure as part of the Business Model Canvas in Section 4:

- Development of the platform: initial costs to develop the API layer, messaging broker, and the foundation of the microservices' architecture, ca. 1 million USD.
- Cloud infrastructure: ongoing costs for the cloud infrastructure, including virtual servers to host the microservices and the cost for ingress and egress traffic, ca. 0.5 million USD per year.
- Support and onboarding of counselors: 1 million USD per year.

Thus, the total ongoing costs are in the range of 1 to 2.5 million USD per year. Using the higher estimates and the average revenue of 1.075 USD per API request and 10.95 USD average revenue per customer journey introduced previously, we can calculate the break-even point as follows:

- Initial investment:
 - 6 million USD
 - 5.6 million API requests
 - 0.55 million counseling clients
- Ongoing costs:
 - 4 million USD per year
 - 3.7 million API requests per year
 - 0.37 million counseling clients per year

To run the service profitably, the CCaaS platform needs to process at least 3.7 million API requests or 370,000 counseling clients per year. Any requests surpassing this yearly threshold will help to offset the initial investment costs of 6 million USD. To offset the initial investment, up to 5.6 million API requests are needed, or 550,000 counseling clients. Beyond these API requests and counseling clients, respectively, the CCaaS platform will be highly profitable due to low marginal costs. 370'000 counseling clients per year translates to 7'000 clients per week. Given LinkedIn's weekly user base of 49 million active users (Käser et al., 2023), this translates to a conversion rate of roughly 1 user out of 7'000 users that has to choose career counseling services. This conversion rate is an attainable goal.

Finally, in terms of economic viability, we also need to assess the impact the new business model could have on the companies existing business model and revenue streams. When introducing a new business model a company has to take care not to disrupt itself and endanger existing business models and revenue streams. The Transformative Business Stream Matrix introduced by Schwaferts and Zhong (2016) allows companies to remain competitive by strategically developing additional business models that do not put existing business models and revenue streams at immediate risk. Because LinkedIn is not engaged in career counseling, the CCaaS business model does not put any existing business models and revenue streams at risk. Even more, through career counseling, LinkedIn's platform becomes more attractive for companies

to post their job ads. Thus, the CCaaS business model is a transformative business model that creates new value and business streams while having a positive impact on existing business models and revenue streams.

6.3 Competitive Advantage

As introduced in Subsection 3.1, LinkedIn is in a unique position based on its massive and unparalleled user database in terms of size, granularity of data, and the graph-like structure. This user database is the key asset and differentiator of LinkedIn versus the potential competitors. Further, LinkedIn's access to advanced AI technology via Microsoft and OpenAI is unparalleled. Only the few tech giants (Alphabet / Google, Amazon, Meta / Facebook, Apple) have access to such resources. Thus, LinkedIn has a unique competitive advantage in the combination of the required data and AI technology. None of the other tech giants has this unique combination that is required to build and run the CCaaS business model. We have seen that for economic viability, the CCaaS business model also requires a certain scale. LinkedIn is one of the companies that has a user base that is large enough to run the CCaaS business model profitably. All of these factors combined make it very difficult and expensive for potential competitors to copy the innovation.

From a systemic point of view, regulations by legislators can be seen as an additional entry barrier (Käser et al., 2023). Firstly, AI might become more and more regulated so that only a few large companies can afford the compliance with these regulations. Secondly, various data protection regulations in different countries make it difficult for new entrants to build up a user base that is large enough to run the CCaaS business model profitably. Regulations will thus likely shield early movers from competition and give them a competitive advantage.

6.4 Customer-Centricity

We have previously introduced the customer perspective on career counseling in Section 2. We extend here by embedding the innovation of AI-powered career counseling as a CCaaS API in the context of this customer perspective. The following aspects are relevant in this context:

- **Reduced Costs:** Career counseling is currently not affordable to many. The CCaaS model will make career counseling accessible to a larger audience by reducing the costs of career counseling through shared infrastructure and shared AI models. CCaaS may fuel further innovation by partners, such as e.g., making career counseling available online to people in remote areas.
- **Personalized Service:** Through the deployment of AI models as part of CCaaS, career counselors will gain a better understanding of individual clients faster. This enables counselors to provide a more personalized service without increasing costs.
- **Assistive Technologies:** generative AI models can help job market entrants to write better CVs and application letters. This may currently typically not be demanded by clients due to the excessive costs. Generative AI can also be used as a chatbot interface to career counselors, thereby reducing the costs of the initial contact with a career counselor.
- **Avoiding Ethical Issues:** Ethical issues in AI-powered career counseling may include biased AI models, the problem of "blackbox" AI models that are not explainable, and Kafkaesque interactions between users and automated systems (Käser et al., 2023). LinkedIn's CCaaS innovation will avoid these issues by using a human-in-the-loop approach where specialized career counselors

are the interface to the client, while AI tools are used to assist the counselors in their work. The counselors can intervene whenever they deem it necessary and add reasoned explanations to the recommendations given to clients.

6.5 Legal Considerations

The following legal aspects are relevant in relation to career counseling and the CCaaS business model:

- **Data Protection:** data protection is a key concern in career counseling as it is centered on data about the education, work experience, skills, character traits, and personal interests of the clients. Regulations such as the General Data Protection Regulation (GDPR) of the European Union or the California Consumer Privacy Act (CCPA) must be strictly followed in order to protect LinkedIn and the counselors from the risks of legal prosecution and fines (California State Legislature, 2018; European Parliament, 2016). In the case of CCaaS, we use data that has been provided by users to LinkedIn already. Further, users have to proactively opt in to career counseling services by using the career counselor matchmaking service: only counselors chosen by the client will have access to that client's data. Tighter regulations and differing legislations may mean that LinkedIn may have to offer regional versions of CCaaS that are operated in local data centers with a subset of the data from users of the same region (e.g., CCaaS Europe, CCaaS North America, etc.). This may affect the quality of recommendations, but would affect competing services equally. Thus, the additional costs from regional data centers may simply be offset by increasing the API usage fees.
- **Liability:** the CCaaS platform provides recommendations for trainings and career paths. Because the CCaaS model does not promote full automation but rather a human-in-the-loop approach where specialized career counselors make the final recommendations, LinkedIn is not liable for the outcome of the final recommendations given to users. However, the CCaaS platform should be liable for any damage caused to counselors based on downtimes of the CCaaS API. Downtimes can be mitigated by well-known strategies for information system design such as redundancy, load balancing, and failover of traffic.
- **Intellectual Property:** the CCaaS platform will use AI models to provide recommendations for trainings and career paths. These AI models are based on data collected from the users as well as feedback data from counselors. There are currently open questions regarding who owns the intellectual property of such models trained on user data, see e.g., Anwer (2021). LinkedIn should onboard counselors using contracts that transfer all IP rights of the feedback data to LinkedIn.

6.6 Sustainability Considerations

Sustainability is a vast topic. To guide its analysis, the Sustainability Development Goals (SDGs) are a good starting point. SDGs are a set of 17 goals defined by the United Nations in 2015 to achieve a better, equitable and sustainable future by 2030 (United Nations, 2015). The following SDGs are of particular interest in relation to career counseling and the CCaaS business model:

- **SDG Goal 4, Quality Education:** CCaaS decreases the cost of professional and personalized career counseling, including assessment of skills and recommendations for training, thereby contributing to a better education for all.
- **SDG Goal 5, Gender Equality:** with a proper design of the AI models, CCaaS can reduce gender-related biases in recommendations of jobs, trainings and career paths.

- **SDG Goal 8, Decent Work and Economic Growth:** CCaaS can help people to find a job that matches their skills and interests. This can increase the productivity of the workforce and reduce the unemployment rate, while maximizing the income and satisfaction of the employees.
- **SDG Goal 10, Reduced Inequalities:** CCaaS can help to reduce inequalities by providing career counseling to people who previously could not afford it. Further, through proper design of the AI models, suitable trainings and career paths can be specifically tailored to the needs of underrepresented groups. However, career counseling is a service that is typically relevant for people who already have higher education. Widespread and affordable career counseling via CCaaS may hence contribute to widening the gap that is building between the highly educated workforce and the low-skilled workforce.

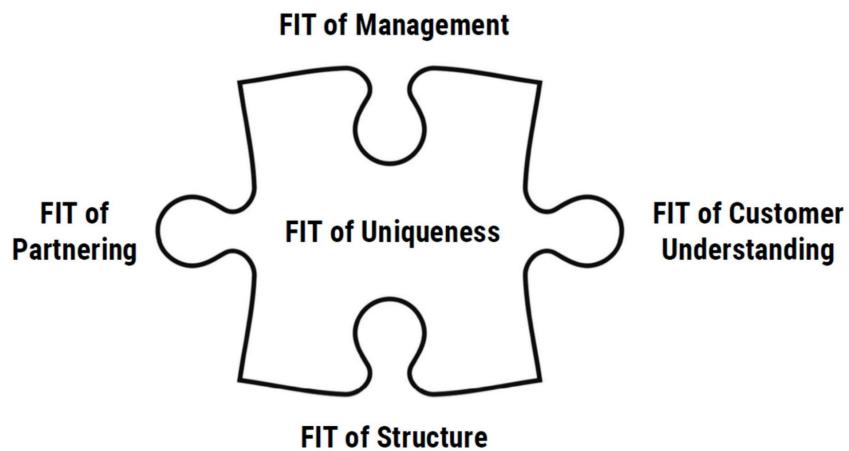
To summarize, CCaaS is a solution that aims to revolutionize the field of career counseling. By leveraging user data, data science expertise, and cloud computing resources, CCaaS makes career counseling more affordable and accessible to a broader audience. With the help of state-of-the-art AI models, career counselors can provide personalized recommendations for trainings and career paths, improving the quality of their services without increasing costs. Moreover, CCaaS addresses ethical concerns associated with AI in career counseling. While it has the potential to reduce inequalities and cater to underrepresented groups, it's important to consider data protection and intellectual property rights. However, the widespread availability of affordable career counseling through CCaaS may contribute to the growing divide between the highly educated and the low-skilled workforce. Finally, LinkedIn has a unique position to leverage on its database, access to AI expertise and scale to make CCaaS happen and not easily copied by competitors. We have also seen that CCaaS is an economically viable business model.

In the following Section 7 we will discuss how the innovation of CCaaS fits into the digital ecosystem of career counseling.

7 System-FIT

System-FIT is a framework introduced by Grieder and Schwaferts (2019); Schwaferts (2020) and helps companies to evaluate the fit of their business model with an existing or emerging digital ecosystem. In particular, Schwaferts (2020) argues that most companies are not able to create their own digital ecosystem and therefore have to join an existing one. The framework thus helps companies navigate, evaluate and choose the right digital ecosystem to join. Further, to be successful in the digital age, companies need to join a digital ecosystem where they can contribute to the value co-creation based on their uniqueness (Grieder & Schwaferts, 2019). In particular, this thinking allows for companies to “*decouple themselves from the traditional thinking of company boundaries*” (Grieder & Schwaferts, 2019, p. 42). In the case of career counseling, we have seen in Subsection 1.3 that it does not meet the definition of a true ecosystem yet. LinkedIn can introduce the CCaaS model to create a new digital ecosystem for career counseling as a value co-creation network with LinkedIn as the most powerful company, i.e., the company of reference at its center. In the following we will thus evaluate the fit of CCaaS as a transformative business model in the emerging digital ecosystem of AI-based career counseling using System-FIT. System-FIT was presented uses 5 dimensions to assess the fit of a business model in a digital ecosystem. The 5 dimensions include *FIT of uniqueness*, *FIT of management*, *FIT of structure*, *FIT of partnering* and *FIT of customer understanding* are presented in Figure 12.

Figure 12: System-FIT framework, reproduced from (Grieder & Schwaferts, 2019, p. 54).



7.1 Fit of Uniqueness

Fit of uniqueness is the understanding of a companies own contribution to the ecosystem, and how it is unique and cannot be easily replaced—or the value contributed—by competitors (Grieder & Schwaferts, 2019, p. 53). The more unique a company’s contribution is, the more it is powerful to influence the ecosystem. The uniqueness of a company’s contribution in a digital ecosystem is determined by its ability to orchestrate the key activities and key resources that are required to create a value proposition in the ecosystem (Schwaferts, 2023, p. 201). CCaaS is a transformative business model that will create a *new* digital ecosystem for AI-powered career counseling. The uniqueness of CCaaS is mostly determined by access to

data and access to machine learning technology. Because LinkedIn is in a “power play” position in terms of breadth and granularity of employee data, as well as the access to the most advanced AI technology through its parent company Microsoft and OpenAI, which Microsoft also invested in.

The key activities of CCaaS are the development and operation of the CCaaS API layer, the development of the AI-based career counseling algorithms, and the development of the career counseling client application. The key resources are the data that is required to train the AI-based career counseling algorithms, the AI technology and the computing resources that are required to run the algorithms and the CCaaS API layer. The key activities (training AI models) and key resources (large and granular database of employee data) are unique to LinkedIn and cannot be easily replaced by another company. The uniqueness of LinkedIn as a main player in the ecosystem is thus very high. For these same reasons, LinkedIn is also the most powerful company in this emerging digital ecosystem. LinkedIn is needed as the central actor and provider of the CCaaS API platform. It is unlikely that any other company will be able to create this ecosystem. The need of LinkedIn is thus absolutely essential.

The uniqueness of the CCaaS model by LinkedIn is limited geographically. While LinkedIn is a global company, the CCaaS model will only be available in countries where LinkedIn is available and where LinkedIn has sufficient user data. Thus, it may happen that another large player appears in other markets, such as China and Russia. However, LinkedIn is already the largest professional network in the world and has a strong brand. It is thus unlikely that another company will be able to compete with LinkedIn in the foreseeable future in this digital ecosystem. The uniqueness of the contribution of the CCaaS model is thus very high and LinkedIn as its central actor is confirmed.

7.2 Fit of Management

In the emerging digital ecosystem of AI-based career counseling, LinkedIn is the most powerful company. LinkedIn is also the orchestrator of the ecosystem via its CCaaS model. Thus, LinkedIn has the power to establish the rules of the ecosystem and to steer the direction of development of the ecosystem. In particular, LinkedIn can exclude other actors from the CCaaS API layer thereby limiting their ability to provide good counseling and recommendations to their clients.

However, the management of LinkedIn should consider the other actors in the digital ecosystem and their needs. In particular, the needs and pains of career counselors and clients need to be integrated into the decision-making processes. As argued previously, the CCaaS model relies on value co-creation and thus requires strong partners that are enabled to innovate via the CCaaS API layer. This form of open innovation will also benefit LinkedIn through increased usage of the CCaaS API that will lead to higher revenues and more feedback data. LinkedIn thus has to act as the orchestrator of the emerging digital ecosystem and ensure proper governance (such as same access and pricing conditions for all players). This will build multilateral trust, lead to alignment of the ecosystem actors and ultimately facilitate and accelerate the joint value-creation. With a steadily increasing workforce with tertiary education in the Western world, the demand for counseling services will continue to grow. The digital ecosystem will thus provide plenty of opportunities for many actors to co-create value and grow together.

7.3 Fit of Structure

The (infra-)structure of the digital ecosystem does not exist yet as such. However, LinkedIn has the data and access to the computation and AI technology resources via its parent company Microsoft. As introduced in subsection 5.5, the system architecture of CCaaS is based on a microservice architecture. This allows for a modular and flexible system structure that can be easily adapted to the needs of the ecosystem actors as

well as to evolving needs: new microservices may easily be added while microservices that are no longer needed could be retired. Of course—referring back to Fit of Management—LinkedIn has to be cautious in taking decisions to retire microservices and consider the needs of the ecosystem actors. The CCaaS API layer should be kept as stable as possible and backward-compatible to ensure that the ecosystem actors can rely on it. Any changes to the API or removing of services have to be planned well in advance and communicated to the ecosystem actors to give them enough time to adapt. Ideally the CCaaS API layer will be extended over time to provide more functionality and thus enable the ecosystem actors to innovate and create more value. Through the API-based architecture, other actors in the ecosystem are empowered to customize their own offerings.

7.4 Fit of Partnering

The new and emerging digital ecosystem of AI-based career counseling is based on the CCaaS model that fully relies on value co-creation. The ecosystem actors are thus partners and each contribute to the value that is created for the counseling clients. Using feedback data from the counselors and clients, the value proposition can be enhanced, and the ecosystem actors can further improve their offerings: the sum of co-created value thereby surpasses the value creation that each actor could achieve on its own. The ecosystem actors are thus interdependent and rely on each other. Using a human in the loop approach as a fundamental ethical value, LinkedIn and career counselors can align on the ultimate goal of providing the best possible career outcomes for the counseling clients, without LinkedIn threatening the jobs of the career counselors through automation. The emerging digital ecosystem will thus be very stable as LinkedIn will be the uncontested central actor, all while being dependent on counselors, e.g., to provide local physical presence. The ecosystem actors will thus be able to rely on the ecosystem and invest in their offerings. The CCaaS model will also allow for a high degree of customization and thus enable the ecosystem actors to differentiate their offerings. The pricing of the API is fair and transparent, although limited competition between different career counselors could arise. However, this competition is likely to improve the quality of the offerings and/or drive down the costs for the counseling clients.

7.5 Fit of Customer Understanding

LinkedIn's CCaaS offering is fully complementary to existing career counselors' services. The CCaaS addresses pains and potential gains of counseling clients that the counselors alone cannot tackle (such as providing affordable career advice, more personalized coaching, and reducing risks in career transitions through better AI-based insights on LinkedIn's data). The CCaaS acts in the best interest and according to the expectations of counseling clients, which will lead to a high degree of customer satisfaction.

The final Section 8 will summarize and discuss the findings from this paper.

8 Conclusion

In this paper we have developed an innovative and transformative digital business model for *Career-Counseling-as-a-Service* (CCaaS). By leveraging the latest AI technologies, such as recommender systems and generative AI models, that are embedded into an API layer, we create a new digital ecosystem for career counseling. The CCaaS model is based on the concept of value co-creation of different actors in the digital ecosystem and customer-centricity. We have identified that career counseling services are not always affordable, and some counselors may lack the expertise required for a particular client. The AI-based CCaaS model addresses these customer pains by providing better insights and enabling career counselors to automate some of their processes. Further, new gains can be achieved by the CCaaS model, such as 24/7 availability due to automation of some services and better personalization of the services as counselors can devote more time to advice the client instead of analyzing the client's data.

LinkedIn is the central actor and enabler of the emerging digital ecosystem and acts as the orchestrator of the ecosystem. It has a unique position due to access to vast amounts of highly granular, graph-like data on users' employments, education, and skills. Further, LinkedIn is part of Microsoft, which also owns a stake in OpenAI. This allows LinkedIn to leverage the latest AI technologies and provide them to the ecosystem actors via their AI models and the CCaaS API layer. We have identified that the CCaaS model is a viable business model for LinkedIn as it can leverage its unique position and data to create a new digital ecosystem and generate new revenue streams without endangering its existing business model and revenue streams.

Technically, CCaaS is designed as a set of microservices that are deployed as an API layer. The API layer is the central component of the CCaaS model as it enables the integration of the different actors in the ecosystem. The microservices' architecture allows for a flexible and scalable deployment of the CCaaS model, including evolving the offering over time by adding or retiring microservices. The CCaaS model is designed to be deployed on the cloud platform of Microsoft Azure (the parent company) to leverage scalability aspects.

All in all, the CCaaS model represents a unique opportunity for LinkedIn to enter into a business model and create a new revenue stream.

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