

Architecting a Modern Digital Business - Designing a Dating App with a Sustainable Business Model and Modern Technology Stack

Carson S. FISCHL

Master 1 European Business Administration

2023-2024

Professor Alfredo BERNAL

Abstract

Over the past decade, online businesses have grown significantly as a component of developed economies. Today, software companies alone make up approximately 10% of US GDP (Sherif, 2023) and have revolutionized various industries. Dating, lead by market leaders such as Tinder and Bumble, is one such industry that has become increasingly digitized - as of 2018, over 50 percent of US couples now meet online. (Rosenfeld & Falcon, 2018) However, in recent years, young people have begun to turn away from dating applications (apps), (Stacey, 2024) due to low quality user experiences and poor relationship outcomes. Dating apps have also failed to consistently monetize users. (The Economist, 2024b) This paper aims to explore why user experiences on existing dating apps are so poor, why this is inextricably linked to the existing monetization strategy used by these businesses, and how this business model can be improved, using Tinder and Bumble as case studies. This paper will also lay out the technical considerations for a new dating app, how one can build and scale

a modern, app-based business, a plan to have this app capture its target demographics, and how this app will be able to sustain its growth and success into the future.

Contents

| | | |
|----------|--|-----------|
| 1 | Introduction | 2 |
| 1.1 | The World of Digital Business | 2 |
| 1.2 | The Existing Market for Dating Apps | 3 |
| 1.3 | Why The Existing Business Model for Dating Apps is Difficult To Sustain | 6 |
| 1.4 | How The Business Model Can Be Improved | 8 |
| 1.5 | Key Takeaways | 10 |
| 2 | Making The App | 12 |
| 2.1 | Establishing a Better Business Model | 12 |
| 2.2 | The User Experience | 13 |
| 2.3 | The Marketing Mix | 15 |
| 2.4 | The Technology Stack | 16 |
| 2.5 | Key Performance Indicators (KPIs) | 20 |
| 3 | Conclusion | 22 |
| | References | 23 |

Acknowledgement

Thank you very much to Professor Alfredo Bernal, as well as my friends and family, for your feedback while writing this paper. Your insights were invaluable towards forming concrete ideas about a multifaceted topic. Please know that your time and support have been greatly appreciated.

1 Introduction

1.1 The World of Digital Business

At the turn of the 20th century, the technology of internal combustion engines was finally maturing. While steam locomotives and early cars had been around for some time, personal automobiles, planes, and other technologies became drastically more widespread - in the USA alone, there were over 23 million personal motor vehicles by 1930, up from 8,000 in 1900.(Statista Research Department, 1993) What the internal combustion engine represented was more than a way to move things around; it represented a more efficient way of doing the physical labor that had shackled mankind for centuries. Humans, as well as horses, mules, oxen, and other beasts of burden, had effectively been absolved of one of our biggest consumers of time and energy.

In 2011, Marc Andreessen published an article in the Wall Street Journal entitled “Why Software Is Eating the World”. In this article, Andreessen, himself an early tech entrepreneur, venture capitalist, and contributor to the Mosaic browser, cites numerous examples of software enterprises changing industries that had previously been assumed to be calcified, with little room for new market participants. Amazon succeeded in disrupting online booksellers, Netflix disrupted video retailers, and Spotify disrupted music distribution, all of whom did so by concentrating and monopolizing the consumer base with software. Each of these companies, through a combination of market dominance and innovative business strategy, profoundly shifted how established industries operated.(Andreessen, 2011) Over a decade later, Andreessen’s essay still serves as gospel for prospective Silicon Valley tech founders.

While Andreessen is primarily focused on internet startups, the broader concept he discusses is how the prevalence of general purpose computers and information technology has profoundly changed the value and accessibility of human mental labor, in the same way that the internal combustion engine drastically changed the value and accessibility of physical labor. This will drastically

shape the value and prevalence of “white collar” office work over the next few decades. However, it also allows technologists and entrepreneurs to capture unprecedented value using software tools, which can be applied to a vast array of human problems.

In particular, Silicon Valley technologists have espoused the “platform” business model, and used software to insert themselves as middlemen into numerous industries. The platform is unique in the sense that is not a producer, like a factory or farm, offering a tangible product or service for sale. However, it is not a consumer either. Instead, platforms position themselves between the producer and consumer, to facilitate transaction and act as an intermediary, ideally with sufficient market share that both producers and consumers are incentivized to deal exclusively through the platform. This creates a “flywheel effect,” where success continually compounds as more users want to be on the hottest platform. The platform is a more powerful evolution of the merchant middleman of yesteryear. AirBnB, Uber, and Lyft are all examples of successful, aggregation platform businesses.

1.2 The Existing Market for Dating Apps

Human romance is a business that has existed for all of civilization. In Orthodox Jewish communities, there exists the shadchan, a matchmaker who seeks out partners for Hasidic Jews within their religious community, sometimes collecting a fee for their services. While some early internet dating services existed that resembled online classifieds, online dating first entered the mainstream in the 1990s, with websites such as kiss.com (1994) and match.com (1995). There were also more overt sites selling prostitution services, such as the notorious Craigslist classifieds and sex.com. Dating, sex, and human sexuality are fundamentally strong businesses to operate in; demand is perpetual, consistent, and self-renewing.

Young women, ages 18-25, are by far the most valuable demographic for dating apps. In his book *Dataclysm*, author Christian Rudder, the founder of

dating app OKCupid, recounts how site users were shown anonymized pictures of members of the opposite sex and asked to rate their attractiveness on a Likert scale from 1 to 5. Men and women from ages 20 to 50 were surveyed. Women's visual attraction ratings favored slightly older men until the age of 30, at which point they favored slightly younger men until age 40, when attractiveness levelled off. However, in general, women's physical attraction to men matured with age. Men, on the other hand, universally rated women as most attractive from ages 20-24; at no age did men mark women over 24 years old as the most attractive. (Rudder, 2014)

While many dating apps intentionally obfuscate the exact ratio of men:women on the platform for business reasons, independent research suggests that almost all existing dating networks have a disproportionate number of men to women. (Modern MBA, 2022) On Tinder, 84 percent of users are men, compared to 61 percent on Bumble. (The Economist, 2024a) This is in line with human sexuality and social norms; as women incur a large degree of health risk with pregnancy and childrearing, and as such, women tend to be choosier about their romantic and sexual partners. While men may choose sexual and romantic discretion as well, many men are less reserved with their sexuality, resulting in these unbalanced gender ratios. Balancing this gender ratio is a major business problem of contemporary dating apps, where men outnumber women by a significant margin.

Strictly speaking, in a business sense, where love and human sexuality are commoditized, the gist of the two preceding points (first, that men are sexually attracted to women in the young adult phase of their lives, and second, that men outnumber women on dating apps), is that **the number of women, and the type of women, are a limiting factor on the growth of any dating app and significantly affect the user experience.**

Despite these caveats, online dating holds appeal for both sexes. In the past, potential romantic relationships were limited to people you physically encountered; classmates, coworkers, people at the bar, club, or social events, and those within the community. Some cultures even have extensive histories of marry-

ing the unwed to extended family members. Online dating drastically increases people's pool of available partners, removes the awkward social interaction that comes from approaching others at social events, and eliminates the social risk that comes from dating in environments such as work or school. It is for these reasons that online dating has gone from a niche product in the 1990s, oft derided as a last resort for the socially and sexually undesirable to find a partner, to a mainstream phenomenon that is the predominant way that people meet their partners in the US today.(Rosenfeld & Falcon, 2018)

We will examine two of the largest players in the contemporary dating app market; Tinder and Bumble. Tinder was launched in 2012 at Hatch Labs, a startup incubator within Match Group, the holding company that owns Match.com. Tinder's user experience is simple, yet was revolutionary to the online dating market. First, users create a profile on the app, which includes your name, photos, and some optional information such as your job, educational background, hobbies, and a brief biography. User appearance is emphasized with large photos of the user above their name on their profile. Users are presented profiles of other users within a user-selected geographical proximity, whom they can then "swipe left" (reject) or "swipe right" (accept) on. If both users swipe right on each other, they have "matched," which allows either user to initiate a conversation with the in-app messaging feature.

Bumble was created by a Tinder cofounder, Whitney Wolfe Herd, following her breakup with fellow Tinder cofounder Justin Mateen, after alleging that Tinder's internal culture was sexist.(Tait, 2017) In terms of mechanics, Bumble functions in broadly the same manner; users create profiles with their name, pictures, some prompts, and basic info like an optional biography, height, educational background, hobbies, sexual and gender orientation, whether or not they smoke, religious affiliation, and whether they have or desire children. However, Bumble added several key mechanics that improved upon Tinder's user experience. For one, in heterosexual relationships, once two users have matched, women are required to message the man first, within 24 hours, to initiate a conversation. While this doesn't always work well in practice (nothing prevents

women from opening the conversation with a simple “hi” to circumvent the 24 hour time limit), and paying to bring back matches that weren’t messaged within 24 hours is now a monetized feature, the broad consensus is that this feature has helped women feel more in control of their experience on the app, which was helped Bumble balance its gender ratio better than other apps - 44 percent of paying users on Bumble are women, which is much higher than Tinder, with whom only 19 percent of paying customers are female.(Tait, 2017) Bumble also introduced options to use the app to find friends or business partners. Bumble remains one of the few independent players in the online dating space, not owned by competitor Match Group, who owns both Tinder and Hinge.

1.3 Why The Existing Business Model for Dating Apps is Difficult To Sustain

In Dataclysm, Rudder gives a frank assessment of the difficulty of continued value capture from online dating services:

A major drawback of data from dating sites is that it tells you next to nothing about people actually going on dates. Once people are together in person, they don’t need messages or ratings or any of that. It’s an irony, both in the data set and in the job itself—you do it right and the customers leave. In pairs, no less!(Rudder, 2014)

Bumble openly states in the disclosures of their 2023 annual report that there is a risk that:

there is a decrease in user retention as a result of users finding meaningful relationships on our platforms and no longer needing to engage with our products; (Bumble Inc., 2024)

Taking as axiomatic that the goal of dating is to find a satisfying relationship, existing dating apps have goals that are diametrically opposed to those of their users. This is a business failure of these apps to monetize the dating process beyond the initial encounter. This applies to all dating services, regardless of

their popularity - once users achieve their goal of finding a partner, they leave the service.

Existing dating apps, with their freemium business model, face a variety of challenges to growing and sustaining their business. For one, the freemium model, used by Tinder and Bumble, involves monetizing users by having them pay for premium features. This may include paying for extra chances to match with more attractive users, or more users in general. Tinder offers “superlikes,” where a user can choose to unilaterally match with users they find particularly appealing. In Bumble’s case, users can pay to message users after the 24 hour time limit has expired. In the case of Match Group product Hinge, users are shown five blurred photos of their “most compatible” matches, who are locked behind a paywall, where users need to pay 3.99 USD for a “rose” to match with those users.(The Economist, 2024b)

As in chess, most dating apps use the Elo ranking system to pair people with partners of comparable desirability and attractiveness. While the exact qualities one looks for in a partner are subjective, most humans desire characteristics such as physical attractiveness, intelligence, moral character, and ambition in their partners. Elo rating systems rank all users on the same continuum, with users moving up the rankings proportionally more if they are “liked” by a user deemed highly desirable by their current ranking.

The single continuum frequently creates a “winner takes all” result in dating apps. Highly desirable users are shown to everyone and receive many matches, and users that fall further in the rankings are seldomly shown to others. Some apps, such as Tinder, offer a “boost” feature, which allows users to pay to be seen by more, and the most desirable, members of the opposite sex. This feature is, of course, another monetization strategy, which costs 8.00 USD at the time of writing.

The common element in all the popular dating apps is that they aim to incentivize users to pay by making the user experience worse for non-paying users. Users who don’t pay are shown to less people, are shown to less desirable people, have less leverage to stand out

to desirable users they do match with, and will eventually be strong-armed into paying if they want an optimal outcome from the app. This “pay-to-win” methodology has proven distasteful to many people. As a result, existing dating apps have seen a catastrophic decline in usership, with less than a fifth of American college students now using them monthly, a significant decline from their peak popularity.(The Economist, 2024b) This decline in user interest is reflected in the stock price; Bumble’s stock (NASDAQ: BMBL) declined from 16.51 USD on August 11th, 2023, to 5.98 USD on August 9th, 2024, a loss of nearly two-thirds.(Yahoo Finance, 2024a) Likewise, Match Group (NASDAQ: MTCH) has seen its share price decline from 44.96 USD on August 11th, 2023, to 34.85 USD on August 9th, 2024, a decline of over 20 percent.(Yahoo Finance, 2024b)

1.4 How The Business Model Can Be Improved

Dating is a good potential market for a platform business. The consumers are obvious: people looking to date. The producers, however, are more difficult to identify. Because of the necessity to balance the gender ratio on a dating app, women, and particularly romantically desirable women, are as much producers as users. However, there is also another producer that can be identified: experience-based businesses, such as restaurants, spas, tourist attractions, museums, and anywhere else prospective daters might choose to go on a date.

Most dating apps only solve the simplest aspect of dating; encountering potential romantic partners. They do this because it is conducive to their business model (selling swipes or potential matches to users) and because it is the simplest aspect of the dating process to digitize. However, in recent years, millennials and gen Z daters have shifted back towards encountering potential partners “in real life.”(The Economist, 2024a) By meeting potential partners through friend groups, shared activities, or chance encounters, the dating process feels more natural, and there is less pressure on both parties to be the central focus of the other person’s attention and judgment.

Using this principle that there are producers (restaurants and other dating experiences) that are seeking clientele, and there are users (people looking to date), **we can create a dating app that both matches people with potential dates, and then monetizes the date by having users reserve and pay for their dates through our app.** We will create a platform where users pick desirable dating experiences, choose how they want to split the cost, and then are matched with other users, at which point they can chat and prepare to go on a date together. Users will pay through the app, and our platform will take 10 percent of the total cost for facilitating the transaction, split between users and the business (a 10 percent “take rate,” in the parlance of platform businesses).

This business model is superior, not only because it allows us to monetize first dates, but there is potential to create a “flywheel effect,” where businesses want to propose new and exciting dating experiences through our platform, and users want to continue to use our platform long into their relationship, to seek out exciting date ideas. A good example of this principle in action is AirBnB use of unique hospitality experiences to drive usership and tourism to places that might not otherwise be appealing getaway destinations. AirBnB’s most recent promotional campaign has celebrities such as Doja Cat offering users a chance to stay at their private residence,(Airbnb, 2024) which encourages user interaction with the platform, even when users are not actively planning a vacation. Similarly, we can encourage people to go on dates by offering them desirable experiences, even if they might not have foreseen going out on that particular evening, to that particular place.

In recent years, a secondary market for reservations at high end restaurants has flourished, thanks to platforms such as Appointment Trader (appointmenttrader.com). (Weiss, 2024) As of April 2023, Appointment Trader had 2.3 million USD in trading volume.(Reyas, 2023) While restaurants are a good target market on the producer side, the business of setting up couples on dates can be applied to many types of experiences. Live events are another market that could potentially be captured at scale; the parent company of Ticketmaster, Live Nation Entertain-

ment Inc. (LYV), has a market capitalization of 21.70 billion USD, and the total market volume for ticket sales globally is now 85.07 billion USD. Capturing five percent of global live event ticket sales, at a ten percent take rate, would equate to an addressable market of over 400 million USD alone. As cited in French economics publication *Challenges*:

Romance isn't limited to bars. Running clubs have become a place for athletes to meet. Cooking classes, too, have become a place to find partners, says Julia Hartz, CEO of Eventbrite, a ticketing platform. Attendance at its singles events increased 42% from 2022 to 2023. "You're connecting with someone, you're having an experience, even if it's not the love of your life," Casey Lewis, a youth culture blogger, says of these types of events.

Furthermore, we will take Bumble's "women pick men" style selection system and curate the dating pool to create a more desirable userbase, rather than simply attempting to attract the broadest userbase possible. This will be supplemented with skilful use of our marketing mix to attract our target demographic, 18-25 year old women. We will also investigate other options for proposing other matches to users, such as AI classification models, instead of Elo rankings, to promote a healthier, more natural dating market. Since we have data from the actual dates people are going on, we also have the potential to monetize the data streams produced by our platform.

These changes (users being proposed and paying for the dates through our platform, changing the ranking system, prioritizing recruitment of female users), serve to address problems with the business model and user experiences of existing dating apps, which have made them increasingly unpopular and unprofitable in recent years.(The Economist, 2024b)

1.5 Key Takeaways

Tinder, Bumble, and other existing dating apps share many of the same issues:

1. Existing apps unnecessarily create a conflict of interest between users and the platform. Apps are disincentivized from helping users from finding

successful relationships because they are unable to monetize those users past the initial encounter.

2. Because human intersexual selection is biased towards women, existing dating apps have unbalanced gender ratios.
3. Due to their matchmaking systems, the app is dramatically less useful to less romantically desirable or non-paying users.

The app, that will be architected in the second section of the paper, will improve on the existing app business model in three ways:

1. Aim for a target demographic of 18-25 year old people, particularly women, with a “women-pick-men” style selection system. This will help balance the gender ratio on the app. Having a healthy gender ratio, and one that is apparent in the user experience, is one of the most important aspects to a successful dating app. Young people are huge drivers of the success or failure of any social media venture.
2. Change the existing monetization strategy of paying for swipes, and instead monetizing the dating experience itself. This aligns the company’s goal (becoming profitable) with user’s goal of finding fulfilling relationships and having positive dating experiences. This also allows our app to position itself as a platform business, that can extract value both up and down the value chain.
3. Eliminate hostile design features such as overly aggressive ranking systems and profit on the long term dating trends of millennials and gen Zers by creating a platform where couples can find worthwhile dating experiences, even after the first date.

2 Making The App

2.1 Establishing a Better Business Model

Our app will be called PUV3 (short for “prendre une verre,” a French term to ask someone to grab a drink together; the three refers to the three ways in which the app will improve the dating experience, from both a user and business perspective). The development will occur at `puv3.vercel.app`. PUV3 will improve upon existing dating apps in three key aspects:

1. We will have a pipeline for both users (people looking for dates) and businesses, who will propose an “experience” to prospective daters.
2. By proposing experiences through our app, we can also capture a market for existing couples to choose new and fun date ideas. This eliminates the conflict of interest existing dating apps have, where they are disincentivized from giving their users the most fulfilling dating experience unless they pay.
3. By providing small businesses with a unique and interesting way to acquire new clientele, we can create a “flywheel effect,” whereby the most popular businesses and attractions will want to be on our app.

With respect to point number one, **we will monetize our application by having users pay for the date through the application, and take 10 percent of the total transaction as our cut.** This is the standard platform business model that has become popular for startups within the past decade, but applied to dating.

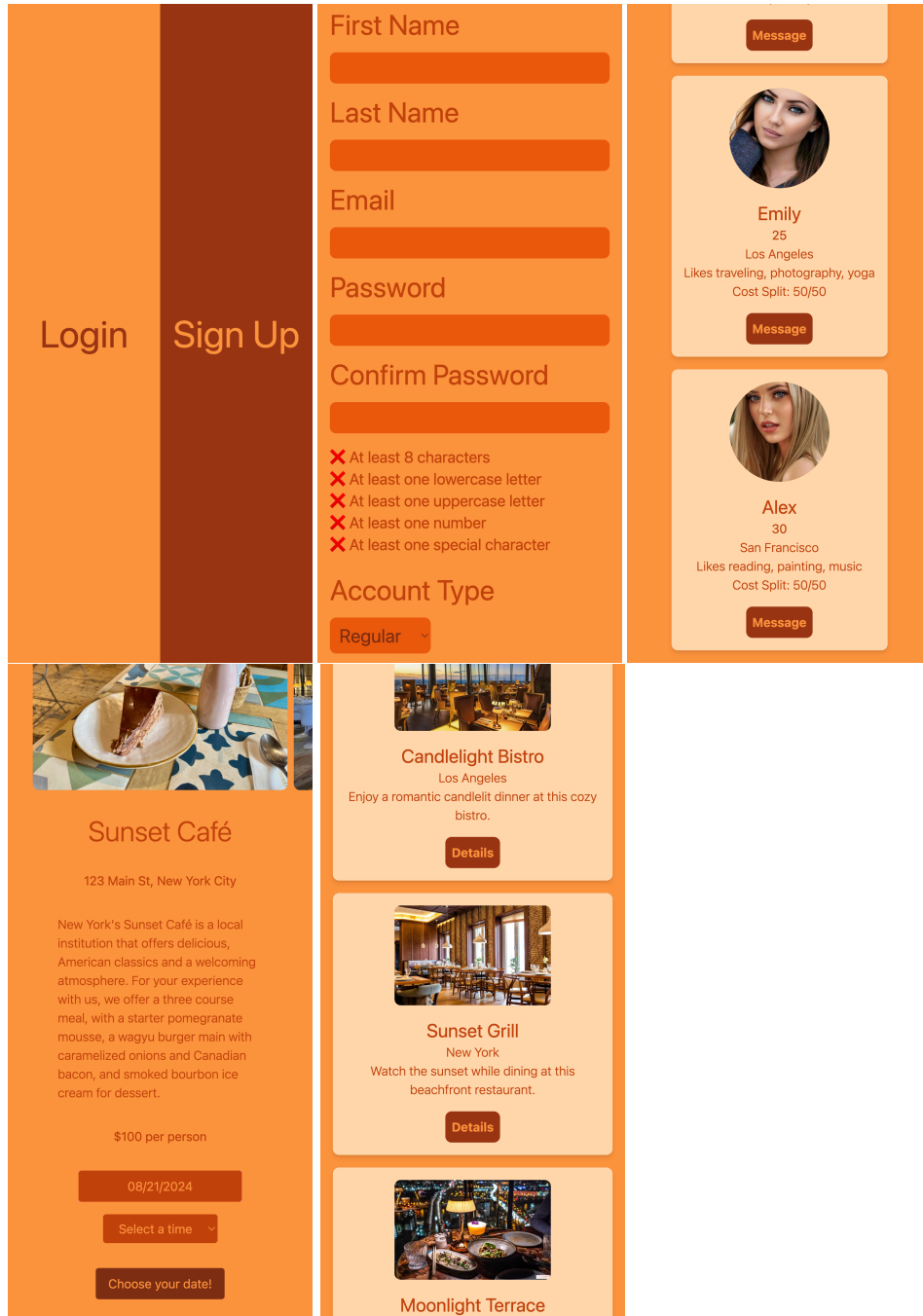
Because the Elo system ultimately ranks people on a single continuum, with all users compared against all other users, we will be “binning” people into general categories and using artificial intelligence to match people with users in categories they find desirable. For instance, a given user might not find muscular people attractive, even though these people generally rank highly in

the Elo system, so it is desirable to have a separate continuum for users who self-identify as fitness enthusiasts or are highly muscular.

2.2 The User Experience

Users will begin by signing up, providing their information, and creating a profile. After signing up, users will be presented a list with potential date experiences in geographical proximity to themselves, with markers indicating the location of each experience, which can be clicked on for a “pop-up” (modal) describing the proposed experience. If they select that location, they will then be shown users who also want to go on dates at that location, with a list of available times and a proposed cost split. They can choose to match with one of those users and select a mutually available time to meet, based on the availability of the venue. If a time and location are agreed upon, both users will be prompted to pay their portion of the cost upfront, through the app. Upfront payment is key to our monetization strategy, and reviews of business user profiles will be used to enforce payment through our app, meaning that experiences that encourage in-person payment will be removed. This will also deter fraud.

Sample UI screenshots on an iPhone 12 emulator:



Users will have a dashboard where they can review their date times, locations, and existing matches. Each match can be selected and will have a separate chat screen. Users will be able to rate their date on a scale of 1 to 5 (respectful, fun, not a “catfish,” etc.), which will be used to ban users who are repeatedly rude or disrespectful towards their date or the establishment.

Business users will have a separate dashboard where they can view booked dates, what experiences they offer to potential daters, and promote or cancel bookings from users they deem undesirable. Users will be able to rate businesses on their profile page on a scale of 1 to 5, with comments about what they did or did not enjoy about the experience.

2.3 The Marketing Mix

A marketing mix consists of the “4 Ps”: product, price, place, and promotion. As an online platform business, we are flexible in terms of place, and the price will vary depending on the experiences proposed to daters by business. However, we will focus on the French market to begin; France has over 3.6 million people between the ages of 20 and 24, and a demographic outlook that is relatively healthy compared to other western countries.(PopulationPyramid.net, 2022) France also has a healthy start-up scene, with the French government reaching an accord with the Qatari government to invest 10 billion EUR into French start-ups by 2030.(Adghirni, 2024) France also has a large base of small businesses that could become users of the app; as of 2017, France has 176,000 independent restaurants and cafés.

Promotion will be focused on women, ages 18-25. Employees of our app will be sent as ambassadors to university campuses, clubs, and urban centers with young populations. Here, they will propose to young people, especially women, to join our app. If we have sufficient funding, we will begin by subsidizing the user experience for these users; a discount code will be given to young women, offering a free first date experience, up to a certain monetary value.

In addition, we will use social media marketing, subject to budget con-

straints. As TikTok and Snapchat are the most popular social media platforms in the 18-29 age demographic,(Zote, 2024) we will partner with influencers on these platforms, as well as produce original, short form video content, showcasing the experiences users can have on our app, showing young couples laughing and having fun.

Businesses will also be targets of promotion, especially early in the business, as having desirable dating experiences at all price points will be key to “laying the groundwork” when expanding into new geographic areas. Employees of our app will be sent as ambassadors to small businesses to proposing them joining the app as a new revenue stream and a way to attract clientele. These ambassadors will help businesses create their profile, take professional photos of the establishment and the experience on offer, and discuss our pricing scheme with the business.

The product will be continually improved, by reviewing user feedback, both for their dates, date partners, and the app itself. Users who repeatedly flake on dates, or treat partners or the date venue poorly, will be removed from the app. Businesses who do not provide the promised service, or provide poor quality service, will also be removed, and businesses that are reviewed highly will be promoted. We will continually invest in technological development, to reduce latency and add features to the app, such as AI matchmaking, providing a better user experience.

2.4 The Technology Stack

Broadly speaking, internet services use the Model-View-Controller (MVC) architecture. This a fanciful term that describes the general concept of how webpages are served to the user. The “view” refers to the user (or “client”) computer, which sends a request to a server (or “controller”) when the user navigates to a webpage. The server responds with the requested files to the user if they are available. If data from a database (the “model”) is required, the server/controller will request that data before sending a response. Modern web

applications are very complex, with many intricacies, so I will not dwell on this topic; however, the gist is that we need to choose a frontend technology (the “view”), which is how we will render the user interface to our users, we need a backend technology to host the application (the server/“controller”), and a database technology (the “model”) to define and hold our user data. We will also require various ancillary technologies to do things like send text reminders to users, collect user payments, and to create a pipeline to efficiently update our app.

The combination of technologies chosen for a given application is colloquially referred to as the “tech stack.” Choosing a tech stack with well-known, established technologies is important towards the longevity of a tech business. Businesses that choose popular, well-supported technologies that are industry standards have an easier time hiring developers to improve their applications, since many developers are familiar with their stack. These technologies are also regularly improved and updated by their own development teams; choosing technologies that are stable and well-maintained mean that there is less risk that we will need to switch to competing technologies in the future, which will incur a large migration cost. Reputable technologies also tend to have larger teams and are more resistant to sabotage; in 2022, the authors of software packages `colors.js` and `faker.js` pushed faulty updates to their free, open source software, resulting in bugs for thousands of websites, in order to protest the lack of support for open source software developers, whose work is integral to large parts of the modern software industry.(Lucero, 2022) There is also a risk that niche technologies, maintained by only a handful of developers, could falter if something happens to the development team; for instance, the author of one of the most popular web server technologies, Igor Sysoev and NGINX (pronounced “engine x”) respectively, is Russian. In 2019, the Moscow offices of NGINX were raided by police, citing a lawsuit from Russian search engine Rambler.ru, who claimed that Sysoev had written NGINX while working for Rambler early in his career, and that NGINX was Rambler property.(Cimpanu, 2019) Russian bank Sberbank has a large ownership stake in Rambler, who are themselves

majority owned by the Russian government. While NGINX remains a leading web server technology, and its current developer, F5, remain nominally independent, the dispute over NGINX's ownership demonstrates how web technologies are not immune from geopolitical risk. Therefore, it is important to consider these factors when choosing technologies to build upon, as you would with any other element of your supply chain.

For the server, we will be using cloud services. Following the crash of the first dotcom bubble and the establishment of Amazon Web Services (AWS) in 2002, it has become increasingly uncommon for companies to own their own infrastructure to host their websites and applications. As of 2024, 93 percent of organizations use cloud services in some form, and by 2025, 85 percent of organizations will be using CSPs as their primary information technology (IT) resource.(Edge Delta, 2024) Cloud services were revolutionary, as they allowed developers to create and host internet applications without needing to invest the large, upfront capital injection to buy server equipment and connect it to the internet. While there is a scale that technology companies may reach where it becomes economical to reinvest in their own IT infrastructure, for most startups, renting server time is the logical option. Often, it is the only option; by 2019, Google had invested over 2.5 billion USD in its Council Bluffs, Iowa datacenter, an amount of capital far beyond the reach of most startups.

In the interest of getting to market efficiently, the primary tool used will be Vercel. Vercel is a private US company offering cloud hosting. However, their primary selling feature is Next.js, a variation of the React web framework that drastically improves the developer experience, with pre-architected CI/CD pipelines, several types of integrated databases, and simplified syntax. While moving towards a cheaper cloud service provider (CSP), such as Amazon Web Services (AWS), will be desirable in the future (Vercel uses AWS as its own cloud service provider), Vercel is an ideal platform to get a digital business running quickly with minimal delay.

For distribution, we will make the app a Progressive Web Application (PWA). PWAs first appeared in the 2010s, as the result of cooperation between oper-

ating system (OS), browser, and web developers to allow for websites to be installed as applications on operating systems. PWAs are identified by this icon in the URL bar:



and can be installed like a native application on most mobile and desktop OSs. Youtube, X/Twitter, and Instagram have all adopted PWAs on their web platforms. Using a PWA for your application has several benefits including:

1. Being able to simultaneously develop for multiple platforms using a single codebase and tech stack.
2. Circumventing the manual review process required to publish on Apple's App Store and Google's Play Store.
3. If we so choose, the Google Play Store and Microsoft stores support listing PWAs.
4. We do not need to engage in revenue sharing with Apple, or any other digital distributors. Apple takes 15 to 30 percent of all transactions that use the billing system on their App Store. While this was recently challenged in a lawsuit by *Fortnite* developers Epic Games, if the existing ruling in *Epic Games v. Apple* stands, Apple only needs to allow third party payment providers on apps installed through the App Store on iPhone.(Leswing, 2024)

For payment processing, we will be using the Stripe API, which is well-documented and very popular among tech startups such as Udemy(Stackshare.io, 2024b) and Instacart(Stackshare.io, 2024a) that require online payment processing. Twilio will be used for 2FA and sending users text reminders for their dates. Push notifications will be used liberally when users agree, to propose new and exciting date ideas as new businesses are onboarded onto the platform.

For the database, we will be using PostgreSQL, also known as Postgres. Postgres is a free and open source relational database, using structured query language (SQL). Data is stored in “tables,” (which might be visualized as rows and columns), and tables can reference other tables, in order to create complex many-to-many relationships (for instance, many men on the dating app might “match” many women, and vice versa). While there are performance implications as our database grows, Postgres is extensible, can have fields (individual data entries) up to 1 GB, and can have nearly 1.5 trillion rows in a single database. For these reasons, Postgres is a popular option for production databases among tech professionals, and is used by the likes of Uber, Instacart, and Netflix, as it is ideal for data heavy applications, such as our usecase.

A tech stack, such as the one described here, has a strong base of established technologies, yet will remain robust and updatable into the future.

2.5 Key Performance Indicators (KPIs)

With social media apps, rapid adoption is key to long term success, in order to create a “network effect,” where people are incentivized to join and stay on platforms that are already used by others. Monthly active users (MAUs) is a reliable statistic for judging the success of social networks, as it ignores users who sign up, but no longer regularly interact with the platform. Bumble was founded in December 2014, and by its IPO in 2021, had 42 million monthly users.(Akhtar, 2021) In the case of Tinder, as of 2023, the platform has 75 million MAUs.(Iqbal, 2024)

For mobile applications, the total number of downloads is another KPI. In the case of Tinder, the app was downloaded 4.9 million times in 2013, after only one year of operation.(Wilson, 2024) Bumble’s growth was less meteoric, with 856,400 users within one year, but the app had 3.9 million downloads by the second year.(Wilson, 2024) In the world of mobile applications, occupying space on the user’s homescreen is key; once users have downloaded an app, it becomes much easier to encourage them to engage with your ecosystem relative

to traditional websites, which previously lacked push notifications.

In recent years, it has become common for tech startups to do development in “stealth mode,” meaning that they keep a minimal public profile, outside of seeking investors, until the product is ready for market, in order to maintain a competitive advantage. For instance, Palantir, who makes data analytics software for military and government clientele, was founded in 2003, and only publicly revealed all the details of all their product lines upon going public in 2020,(Bhattad, 2020) in order to prevent the premature entry of competitors into the market before Palantir had established a de facto monopoly. With digital platform businesses, the defensive moat for the business is the network effect it has between producers and consumers, as well as those established business relationships, not the technological development itself.

While designing and building a modern web app is not trivial, the knowledge is not proprietary, and a well-funded competitor with sufficient developer talent can create and scale a basic functional equivalent to a platform such as Instagram or eBay in a matter of months, or even weeks. For instance, when scooter rental platforms Bird and Lime were created in 2017,(Hawkins, 2018) dock-less scooter rentals were uncommon; by 2022, there were over a dozen scooter sharing companies operating, including, but not limited to, Lyft, Dott, Bird, Lime, Uber, Bolt and TIER.(Statista Research Department, 2024) In the case of scooter rentals, none of these companies created the GPS systems, scooter hardware, or payment networks required to run these businesses; they merely created the software that allowed users to rent the scooters. Since the technological barrier for this market was not overwhelmingly high, it was easy for competitors to move in and take market share. The end result was many scooter companies operating at a loss, and engaging in a desperate race to be the first to operate in new geographic areas and push out competitors before they become established. While a business can still operate in a competitive environment, it is ultimately easier to have no competition than to be the first or the best.

For a platform such as a dating app, being fully market ready at launch, with three to six months of full time development already invested, is a critical

headstart to maintain a lead over well-funded competitors. All basic functionality for the app should be in place, with ongoing development to add features. One million downloads and one million MAUs is a good goal for within one calendar year of launch. We should also strive to have at least 1 restaurant per square kilometer in urban centers, beginning with targeting two major cities, Bordeaux and Paris (chosen simply on geographical proximity). Top-of-funnel marketing such as email marketing, public outreach, and social media can be used to build a client base before the official launch; for instance, by directing users to our site via social media advertisements, we can gather their emails, through which we will notify them of our launch. This top-of-funnel marketing means we will have prospective clients immediately at launch. We can also have restaurants pre-register for the platform prior to launch, so there is a wealth of experiences for users to choose from; this can be achieved through staff outreach, by sending employees to speak with restaurant managers and assisting them with the onboarding process.

3 Conclusion

As fast as they rose to mainstream prominence, the general public and mainstream media have now taken notice of the decline of the popularity of dating apps in mainstream culture. Millennial and gen Z social media is filled with people complaining about their poor user experiences on these platforms, justifying why they are abandoning them for alternative methods of finding a partner. However, the fundamental appeal of online dating remains strong; by creating a better platform, with a business model that aligns the success of the business with the success of its users, we can create an ethically sustainable online business that can capture the dating market into the future. Building such an app is technologically feasible. Whether PUV3 can rise to the occasion and occupy this market opening remains to be seen, but one thing is clear: there is never an industry too old or established to be disrupted.

References

- Adghirni, S. (2024, 02). *Qatar to invest €10 billion in french start-ups, funds by 2030*. Retrieved 2024-08-15, from <https://archive.is/aHjxs>
- Airbnb. (2024, 10). *Join a living room session with doja*. Retrieved 2024-08-15, from <https://www.airbnb.com/rooms/1126323793761779132>
- Akhtar, A. (2021, 01). *Bumble just publicly filed for an ipo, revealing 42 million monthly users*. Retrieved 2024-08-20, from <https://www.businessinsider.com/bumble-files-to-go-public-ipo-2021-1>
- Andreessen, M. (2011, 8). Why software is eating the world. *Wall Street Journal*.
- Bhattad, R. (2020, 08). *This company is just coming out of stealth mode after 17 years*. Retrieved 2024-08-30, from <https://thesalesopsguy.com/2020/08/26/this-company-is-just-coming-out-of-stealth-mode-after-17-years/>
- Bumble Inc. (2024, 01). *Annual report 2023*. Retrieved 2024-07-26, from https://www.annualreports.com/HostedData/AnnualReports/PDF/NASDAQ_BMBL_2023.pdf
- Cimpanu, C. (2019, 12). *Russian police raid nginx moscow office*. Retrieved 2024-08-18, from <https://www.zdnet.com/article/russian-police-raid-nginx-moscow-office/>
- Edge Delta. (2024, 05). *How many companies use cloud computing in 2024? [10 statistics and insights]*. Retrieved 2024-08-18, from <https://edgedelta.com/company/blog/how-many-companies-use-cloud-computing-in-2024>
- Hawkins, A. J. (2018, 09). *The electric scooter craze is officially one year old — what's next?* Retrieved 2024-08-30, from <https://www.theverge.com/2018/9/20/17878676/electric-scooter-bird-lime-uber-lyft>
- Iqbal, M. (2024, 07). *Tinder revenue and usage statistics (2024)*. Retrieved 2024-08-30, from <https://www.businessofapps.com/data/tinder-statistics/>

- Leswing, K. (2024, 01). *Here's what apple had to change as a result of the epic games legal battle*. Retrieved 2024-08-15, from <https://www.cnn.com/2024/01/16/what-apple-had-to-change-as-a-result-of-the-epic-games-legal-battle.html>
- Lucero, M. (2022, 02). *The story behind colors.js and faker.js*. Retrieved 2024-08-18, from <https://www.reverera.com/blog/software-composition-analysis/the-story-behind-colors-js-and-faker-js/>
- Modern MBA. (2022, 10). *How online dating apps make billions*. Retrieved 2024-07-26, from <https://youtu.be/mW9xvSi-MWs>
- PopulationPyramid.net. (2022). *France*. Retrieved 2024-08-15, from <https://www.populationpyramid.net/france/2023/>
- Reyas, M. A. (2023, 04). *“los ricos van a pagar lo que sea”. el negocio de la reventa llega a la reserva de restaurantes*. Retrieved 2024-08-15, from <https://www.directoalpaladar.com/viajes/ricos-van-a-pagar-que-sea-negocio-reventa-llega-a-reserva-restaurantes>
- Rosenfeld, R. J. T., Michael J., & Falcon, M. (2018). *How couples meet and stay together (hcmst)*. Retrieved 2024-07-26, from <https://data.stanford.edu/hcmst>
- Rudder, C. (2014). *Dataclysm: Who we are when we think no one's looking*. Crown Publishers.
- Sherif, A. (2023, 03). *Tech sector as a percentage of total gross domestic product (gdp) in the united states from 2017 to 2022*. Retrieved 2024-07-25, from <https://www.statista.com/statistics/1239480/united-states-leading-states-by-tech-contribution-to-gross-product/>
- Stacey, S. (2024, 5). *Young women are falling out of love with dating apps*. *Financial Times*. Retrieved from <https://www.ft.com/content/b0862016-e225-427e-88c9-4825c2c56000>
- Stackshare.io. (2024a, 08). *Instacart*. Retrieved 2024-08-15, from <https://stackshare.io/companies/instacart>
- Stackshare.io. (2024b, 08). *Udemy*. Retrieved 2024-08-15, from <https://stackshare.io/companies/udemy>

- Statista Research Department. (1993, 12). *Number of passenger cars and commercial motor vehicles in use in the united states from 1900 to 1988*. Retrieved 2024-08-15, from <https://www.statista.com/statistics/1246890/vehicles-use-united-states-historical/>
- Statista Research Department. (2024, 01). *E-scooter sharing market shares worldwide in 2022, by provider*. Retrieved 2024-08-30, from <https://www.statista.com/statistics/1448186/e-scooter-sharing-market-shares-worldwide/>
- Tait, A. (2017, 8). *Swipe right for equality: how bumble is taking on sexism*. Retrieved 2024-08-11, from <https://www.wired.com/story/bumble-whitney-wolfe-sexism-tinder-app/>
- The Economist. (2024a, 08). *Tinder, bumble... pourquoi les gens ne sont plus amoureux des applications de rencontres*. Retrieved 2024-08-15, from https://www.challenges.fr/entreprise/tech-numerique/tinder-bumble-pourquoi-les-gens-ne-sont-plus-amoureux-des-applications-de-rencontres_902152
- The Economist. (2024b, 08). *Why people have fallen out of love with dating apps*. Retrieved 08/11/2024, from https://www.economist.com/business/2024/08/08/why-people-have-fallen-out-of-love-with-dating-apps?utm_campaign=feed&utm_medium=referral&utm_source=later-linkinbio
- Weiss, G. (2024, 4). An ivy league sophomore says he found a 105,000 side hustle: selling coveted restaurant reservations. *Business Insider*. Retrieved from <https://www.businessinsider.com/brown-sophomore-sold-105000-dollars-in-restaurant-reservations-2024-4>
- Wilson, R. (2024, 02). *Tinder downloads are falling but the dating app era isn't over yet*. Retrieved 2024-08-30, from <https://edition.cnn.com/2024/02/14/business/dating-apps-2024-hinge-tinder-dg/index.html>
- Yahoo Finance. (2024a, 08). *Bumble inc. (bmbi)*. Retrieved 08/11/2024, from <https://finance.yahoo.com/quote/BMBL/>
- Yahoo Finance. (2024b, 08). *Match group, inc. (mtn)*. Retrieved 08/11/2024,

from <https://finance.yahoo.com/quote/MTCH/>

Zote, J. (2024, 02). *Social media demographics to inform your 2024 strategy*.

Retrieved 2024-08-15, from <https://sproutsocial.com/insights/new-social-media-demographics/>

Annex 1: Flow chart demonstrating user progression through the app.

