

Team 68

Baymax

A new type of customer service, with AI.

Team Members:

Eric B. Chen (M&T)

Sahitya Senapathy (M&T)

Tyler Edwards

Brandon Adiele

William Fan

Faculty Advisor:

Mark Yatskar

TA Advisor:

Qi Xue, Alice Li

*formerly known as Pam

Product Description:

Baymax is the customer-service-as-a-service (“CSaaS”) platform for small businesses. Baymax allows SMBs to connect their data sources—such as documents, databases, and content—to create automated receptionists that can handle workflows (Appendix 1a). Baymax operates over webchat, phone, or in-person and is audio-native, meaning it can listen to someone’s audible request and respond with voice. Baymax also operates with a self-serve model i.e. businesses can simply add access to or upload relevant data, and the Baymax platform can create receptionists without requiring any coding or debugging. These receptionists can be connected to a physical hardware device (such as an iPad at a front desk), a business phone number, or an internal webchat or text-based assistance tool for existing workers (Appendix 1b).

Problem Space and Value Proposition:

In most businesses, addressing customers instantly is critical as it allows one to convert leads into sales, provide customers with better service, and save time by not needing to go back and answer stale requests.

However, many small and medium businesses (SMBs) often don’t have the resources to respond to customers at all times (manning phones, responding to emails, greeting in-person, etc). Full-time or part-time receptionists can be expensive and other third-party solutions (e.g. call centers) are also expensive and lack transparency.

Baymax provides customized real-time responses to any customer question or request, including completing tasks on the backend. With Baymax, 99% of customer requests will be answered without the need for additional hires. Baymax is highly customized to each business’s data and provides accurate responses with human-like latency, providing a more compelling customer experience.

Customer Segment and Size/Growth Estimation:

The target customer segment is small businesses with annual revenues between \$1M-\$30M. This customer segment is attractive from a market standpoint because it contains unaddressed demand compared to more traditionally complex or challenging segments such as enterprise or consumer. Further, the self-serve model of Baymax, which allows for easy setup and acceptable response quality is best suited for SMBs rather than enterprises, which would require more complex sales, extensive integration,

and far higher standards of quality for AI receptionists or automated customer service products. This means that from a customer acquisition strategy, we can focus on product-led growth rather than having to build out an extensive salesforce and invest in long and complicated sales processes. Instead, we can opt to make the Baymax platform as easily interoperable with common SMB systems such as Google Calendar, Microsoft OneDrive, and SQL systems (and the like) to allow for rapid customer usage and experimentation.

The small and medium-sized business (SMB) market, particularly in the realm of SMB software, is experiencing significant growth. From 2022 to 2027, the global SMB software market is expected to grow by USD 57.76 billion, progressing at a compound annual growth rate (CAGR) of 7.41%. This growth is largely driven by the increasing demand for cloud-based applications, which offer SMBs lower initial costs and faster implementation times, thereby enhancing business efficiency and adaptability to remote working conditions (Yahoo Finance).

In the United States, SMBs are a substantial economic force, accounting for approximately 44% of the GDP and employing nearly half of the workforce. The diversity of this sector is broad, with SMBs engaged in various industries from tech to service sectors. However, despite their significant contribution to the economy, SMBs face challenges such as a lack of awareness about the benefits of modern SMB software, particularly in developing regions, and the competition from free open-source software solutions, which are often preferred due to their affordability for businesses with limited IT budgets (McKinsey & Company).

Market Research:

An important factor we are considering is industry tailwinds in favor of customer service automation. Several Silicon Valley leaders, including Sam Altman, believe that this will be a defining market for the years to come:

"I'm trying to think of like a big category that I believe can be massively impacted.

I guess I would say, customer service is a category that I could see there are just way fewer jobs relatively soon.

I'm not even certain about that. But I could believe it." - Sam Altman

We believe this represents a highly attractive category, especially for small businesses.

Several market indicators reveal that SMB customer service is an underserved blue ocean. According to the US Small Business Administration (SBA), there are 33,185,550 small businesses in the US, which employ 61.7 million Americans. These small businesses make up 99.9% of all US firms.

In the call center and customer service industry, the most important metric regarding phone interactions is Average Wait Time (AWT). According to a study, only around 60% of customers are willing to wait in a phone queue for less than two minutes. Moreover, 13% refuse to accept any hold times. More shockingly, almost 33% of customers will completely abandon and churn if they don't receive a quick response.

We've begun a pilot with an educational training SMB called Project Management Training Institute, which is owned and operated by the parents of one of our group members. In this pilot, we will have an opportunity to implement and utilize our software in a production-setting and experiment with various use cases. Based on these learnings, we plan to iterate on our product and commercialization strategy. The company has agreed to let us test Baymax in a real customer service role which will interact with customers in real time.

Stakeholders:

As a SaaS platform, Baymax has the following stakeholders:

Customers (SMBs):

- We will be selling Baymax as a service to various customers, who will be predominantly small and medium-sized businesses where the owners or high-level managers tend to make purchasing decisions. As mentioned before, the pain points we are attempting to address for these customers is the gap between their amount of human capital and the amount of resources needed to answer phone calls accurately at all times.
- These SMBs are the ones paying for the services and our goal is to provide them with the maximal value add in terms of phone-based customer service that is possible. However, to improve the experience of the end-user (the SMB's customers), we also rely on the SMBs to take the time to upload a large corpus of accurate data to better customize their Baymax model.

End Users (Customers of the SMBs):

- Although SMBs are our customers, the ultimate end user who will interact with the platform will be the customers of the SMBs. When they call a business, these end users expect to be 1) helped and 2) given the exact information or help they are looking for. Currently, these end users often face pain points regarding 1) frustrating phone trees they have to work through by pressing on their number pad only to be faced with an unhelpful pre-recorded response, 2) extended waiting periods to talk to a human associate, or 3) their calls not being answered at all (especially during off-hours).
- These end users are the ones who will dictate the success of the service based on their satisfaction levels and whether they feel their requests were adequately handled by the system. This satisfaction can either be measured directly through surveys or business analytics measures of their retention.

API and Cloud Providers:

- As a platform, Baymax relies on several APIs to handle key parts of handling customer requests. The three key areas that we lack the resources to develop internally are speech-to-text transcription, the customized LLM, and text-to-speech conversion. Currently, in production, we use Whisper, GPT-3.5 Turbo, and ElevenLabs, respectively, for each of these parts, but we may change APIs depending on our needs. For hosting, we use AWS. We will also need to integrate with APIs of customer systems of Google Calendar, Microsoft OneDrive, and SQL. Lastly, we also depend on Twilio's telephony API and service for handling phone calls and routing them to our server to generate AI responses.
- Although each of these APIs provides high-quality results, we understand that a key risk that they provide is that when any of these parts are out of service, our whole platform does not function at full capacity. To address this, we plan on pre-computing responses and having smaller open-source models as backup options to increase reliability.

Competition:

Baymax's competition includes the following:

1) Human Labor / Receptionists

- a) The biggest competitor to Baymax is existing labor for reception or customer service. This is what most SMBs are used to and may be more comfortable with, and finding early adopters who are willing to try substituting their normal employment role for their receptionist or customer service representative will be important for Baymax. However, the biggest challenges with existing labor are high acquisition costs and high churn rates. Acquisition cost not only represents the time it takes for SMBs to put out job postings for receptionists but also interviewing time, offer negotiation, employee education, and employee performance evaluation. Often, the case is that the learning curve for people is surprisingly high when having to adapt to a new role, and it can be weeks if not months before an individual is at an acceptable proficiency required for the job. However, by the time the individual has attained this level, it may be the case that they receive a competing offer that is more attractive. This common occurrence leads to problem two, which is high churn rates. In 2022, the customer service rep turnover rate in the U.S. was 38%, a number that has been steadily increasing in the past several years. If we expect this trend to grow, we can similarly presume that SMBs will have to suffer the costs of employee turnover or be forced to pay higher salaries in an effort to retain their workers. In the case of the former, SMBs will lose out on revenue, and in the case of the latter, they will lose money on increased salary costs. Either way, the need for some level of automation seems all but inevitable.

2) Website Chatbots

- a) Website chatbots are a formidable competitor because they have existed on the market for much longer than conversational LLMs and thus have more market penetration. However, they have two pitfalls. One, they are text-native, which means that they can only operate in written environments. A competitive advantage of Baymax is the ability to operate in spoken environments by audio processing and audio generation, which not only gives a more human touch to the service but also allows for usage in use cases that are unattainable for website chatbots. The second advantage of Baymax is AI search, which allows for more sophisticated and relevant responses than what is possible with

existing implementations of Website Chatbots out there, even if they claim to have cutting-edge AI techniques (that in reality are not state-of-the-art).

3) Foreign Call Centers

- a) The problem with foreign call centers is that while small business owners are familiar with these services, the quality is usually very lacking, payment to a foreign entity is challenging from an accounting perspective, and businesses often have concerns about data security/privacy. Baymax resolves all of these concerns by improving quality above the mean since answers are based on factual business data, Baymax is US-based and charges more cost-effectively, and all data is held securely within Baymax servers requiring only read-only access to all relevant digital assets.

4) API Providers

- a) The problem with API providers is that most small business owners are not software-native, meaning that any competing platform that requires business owners to code software to integrate their AI receptionist will fail to gain traction because the adoption curve is too steep. In contrast, the Baymax platform offers the simplicity of a 1-click connection, only requiring easy upload or access and auto-generation of relevant AI assistants. The key differentiator here is the simplicity of adoption of the Baymax platform.

Go-To-Market

Our go-to-market strategy will be sales-driven. We plan to target businesses within our target customer segment but with the following constraints:

- **In Philadelphia:** we want to launch Baymax to one shared urban location in order to increase spillover effects in adoption between different local businesses. This will also reduce our sales costs and allow us to leverage local knowledge within the sales team.
- In one of the following business categories:
 - **Restaurants:** As shown in our demos and research, we think restaurants are the optimal place to start due to the well-structured requests they typically get and the level of similarity between requests.

- **Hotels & Motels:** Hotels & motels present a powerful learning opportunity as their requests are also well-structured but still distinct from restaurants. We will be able to see how well our platform functions in very separate use cases.
- **Small D2C Brands (e.g. Shopify storefronts):** These requests are less well structured and lower in volume (measured in interactions per revenue) relative to restaurants. As a result, if we can generalize our platform to D2C e-commerce, then that paves the way for expansion to many other verticals.

Revenue and Cost Model

Like most B2B SaaS companies, we are pursuing a subscription-based business model. As described above, we are pursuing the customer segment of businesses with \$1MM-30MM in annual revenue. As a result, we have two tiers of pricing:

1) A basic plan at \$990/month that includes 400 interactions a day

2) A premium plan at a negotiable price based on the needs of the business.

An “interaction” is any continuous session between our customer and their end customer. This could be one phone call, one web chat session, or one in-person greeting session.

We believe that the basic plan can sufficiently fulfill the needs of >90% of our target customer segment as most customers we have talked to mentioned that they deal with anywhere between 5-200 phone calls a day. We set a ceiling of 400 to allow for web chat sessions, in-person greetings, and potential expansion to email.

On the cost side, we have included our unit economics below in Appendix 2. As you can see, based on our predicted utilization, we should be able to generate a profit margin of 76% each month. Our costs are mainly driven by API call costs but we will drive margin expansion by transitioning to using our own hosted versions of open-source models instead of relying on OpenAI and other providers.

Lastly, we anticipate a moderate customer acquisition cost of \$125 that is driven by our sales-led approach to go-to-market. Our CAC costs are currently estimates because we don't have enough data to inform the rates at each step of our funnel.

Appendix 1a: Customer Business Portal Demo

<https://youtu.be/lpjzvVQW-xI>

Appendix 1b: Phone Demo

<https://youtube.com/shorts/53dibBLVyvg?feature=shared>

Appendix 2: Revenue and Cost Model

Unit Economics				
FAQ Calls		Telephony Cost	Audio Cost	LLM Cost
Average duration of one call (minutes)	0.84	\$0.007140	\$0.005040	-
Average input tokens	45	-	-	\$0.000023
Average output tokens	55	-	\$0.003300	\$0.000083
Total Cost				\$0.015585
Advanced Calls				
Average duration of one call (minutes)	3.25	\$0.027625	\$0.019500	-
Average input tokens	150	-	-	\$0.000075
Average output tokens	95	-	\$0.005700	\$0.000143
Total Cost				\$0.053043
FAQ Chats				
Average input tokens	75	-	-	\$0.000038
Average output tokens	65	-	\$0.003900	\$0.000098
Total Cost				\$0.000135
Advanced Chats				
Average input tokens	200	-	-	\$0.000100
Average output tokens	125	-	\$0.007500	\$0.000188
Total Cost				\$0.000288

Hosting				
AWS				\$2.45
Total Cost				\$2.45
Average SMB	Quantity	Cost		
FAQ calls / day	120	\$1.870200		
Advanced calls / day	65	\$3.447763		
FAQ chats / day	150	\$0.02		
Advanced chats / day	75	\$0.02		
AWS cost / day		\$2.45		
Total cost / day		\$7.81		
Total cost / month		\$234.29		
Monthly subscription price		\$990.00		
Monthly net profit		\$755.71		
Monthly Margin		76.33%		
One-time Costs				
<i>Physical Baymax automated greeter</i>				
Hardware Components		\$25.00		
Casing		\$20.00		
Labor		\$80.00		
Total cost		\$125.00		