UNIVERSITY STUDENT CATEGORY
REGISTRATION FORM GRAND FINAL
BACH KHOA INNOVATION 2025

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PROJECT'S INFORMATION

1. PROJECT'S NAME:

Research field (Maximum 3 options):

- *Electricity and Electronics;*
  AutoMate utilizes embedded systems such as STM32 microcontroller, along with components like microphones, and LED modules - requiring deep knowledge in electronic circuit design, power management, and real-time signal processing.
- *Transport Engineering;*
- AutoMate is designed to interface directly with various vehicle systems via UART/I2C/CAN protocols, making it a practical application of transport system integration and in-vehicle network communication.

2. SUMMARIZING YOUR IDEA/PROJECT (Maximum of 500 words)

AutoMate is an offline voice-controlled assistant system that helps drivers operate their cars safely and hands-free -even without internet.

In Vietnam, most cars don't have smart features. Drivers still rely on manual buttons, outdated controls, or even their phones -which leads to distractions and safety risks. Some solutions like Google Assistant or CarPlay exist, but they all require internet or expensive cars. That's a problem.

AutoMate solves this by offering an affordable, offline, plug-and-play voice assistant for any car. It lets drivers control basic functions -like turning on lights, adjusting the AC, or receiving maintenance reminders -using only voice commands. No screen-touching. No mobile data. Just speak.

The system includes a small dashboard-mounted robot called the **"robot key."** It's not just a button -it's a friendly interface that lights up, reacts, and responds to your voice. Drivers talk to the robot, and the robot controls the car through real-time microcontroller communication.

AutoMate comes in two versions:

- **Lite**: Low-cost, ESP32-based. Controls simple features, perfect for older cars.
- **Standard**: Raspberry Pi + STM32 setup, supports CAN and OBD-II, adds advanced controls (e.g., seat heating, parking sensors) and emotional robot feedback.

What makes AutoMate special?

It's offline, affordable, hardware-integrated, and emotionally engaging. It's made for real drivers, in real cars -not just luxury vehicles.

With AutoMate, we aim to make driving in Vietnam safer, smarter, and more human -one voice command at a time.

3. DETAILS OF YOUR IDEA/PROJECT (Minimum of 300 words)

The idea (product/service) is innovative and unique, addressing problems and challenges with creative solutions.

It demonstrates clear improvements in business processes by introducing new techniques or methods to enhance efficiency or quality.

It demonstrates distinctive features, setting it apart from existing alternatives and contributing to positive change in an industry or field.

a. Problems and Opportunities

Most vehicles in Vietnam -especially older cars -still lack smart features. Drivers have to press physical buttons or use their phones to control basic functions. This leads to distractions, safety risks, and frustration.

We define the **problem.**

- Just 2 seconds of distraction can double the risk of a crash (AAA Foundation).
- In 2024, Vietnam recorded nearly **10,000 traffic deaths** (VietNamNet)
- The government now fines drivers **up to 6 million VND** for using phones while driving. (Degree 168/2024)

And while smart assistants like Google or Siri exist, they depend on mobile data - which is unreliable in rural areas, tunnels, or underground parking. Meanwhile, most factory-installed assistants only come with expensive vehicles and for their own brands.

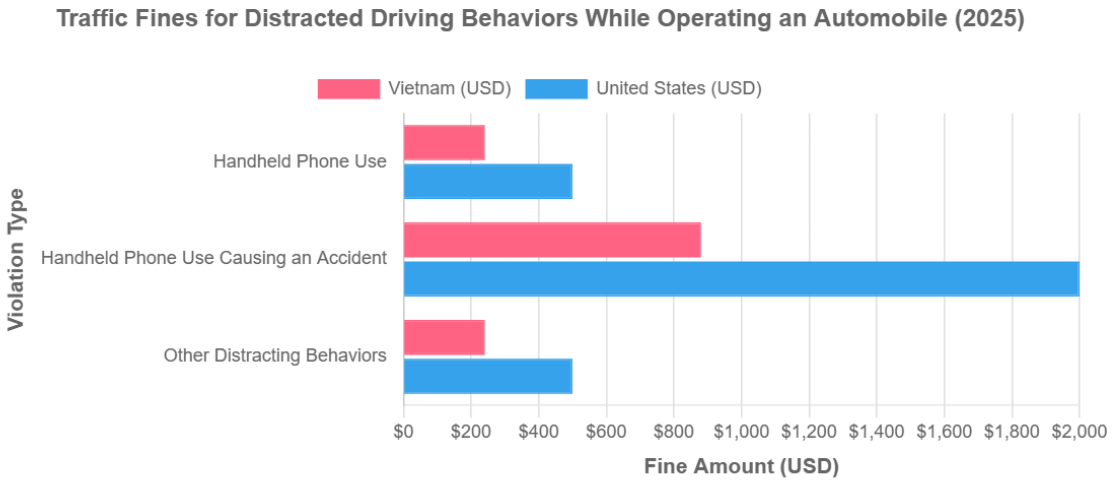
Now the **opportunity**:

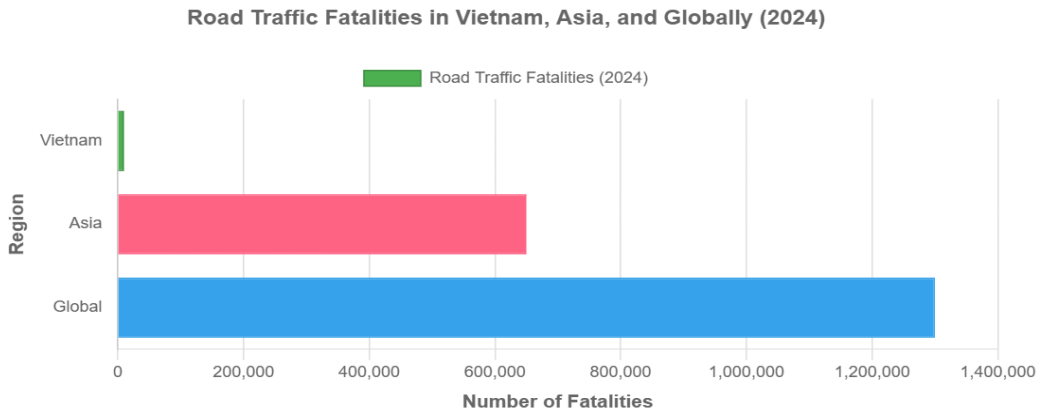
- **Over 5 million cars** are currently in circulation in Vietnam - and most don't have built-in voice control.
- Around **500,000–600,000 new cars** are sold every year.
- Less than **35% of all vehicles** today support embedded voice assistants.
- And from 2026, Vietnam will begin restricting gas-powered motorbikes in Hanoi - a clear sign of the country's push toward greener mobility.

Electric vehicles are changing how we interact with cars. With fewer buttons and more automation, voice control isn't just convenient - it's essential.

AutoMate is built for that shift - and it's ready right now.

Offline, affordable, and hardware-integrated, it brings smart control to both traditional cars and EVs -without needing the internet or a luxury price tag.





b. The AutoMate Solution:

Smart car tech shouldn't be limited to luxury vehicles or cloud-based systems. **AutoMate brings voice control to any car -no internet, no friction, just your voice.**

It's an offline assistant that helps drivers control essential car functions without taking their hands off the wheel. From turning on lights to checking vehicle status, everything runs locally and reliably -even when you're out of signal.

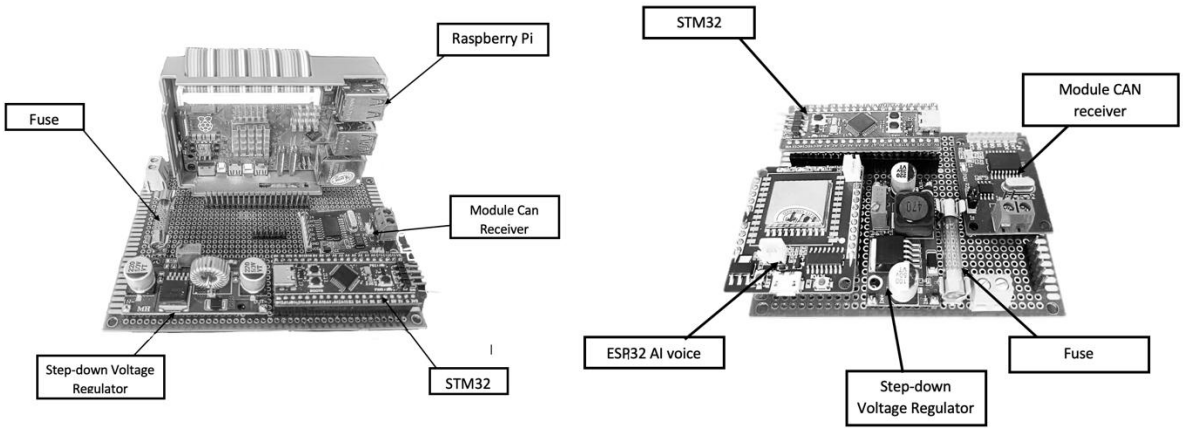
We offer two versions:

AutoMate Standard is built for deeper integration. It connects directly to the car's systems via CAN and OBD-II, allowing for advanced control like AC, defogging, seat heating, and diagnostics. It's perfect for drivers who want a smarter, more connected experience.

AutoMate Lite keeps things simple. It delivers the same voice control and offline performance in a more accessible setup -ideal for older vehicles or DIY upgrades.

Both versions use the same robot key -a compact, expressive figure that sits on the dashboard and lights up when spoken to. It brings voice control to life, and adds a personal touch to the driving experience.

AutoMate is built for the 5+ million cars in Vietnam that still lack smart features -and for the next wave of vehicles that will rely more on voice than buttons.



Standard Architecture in reality

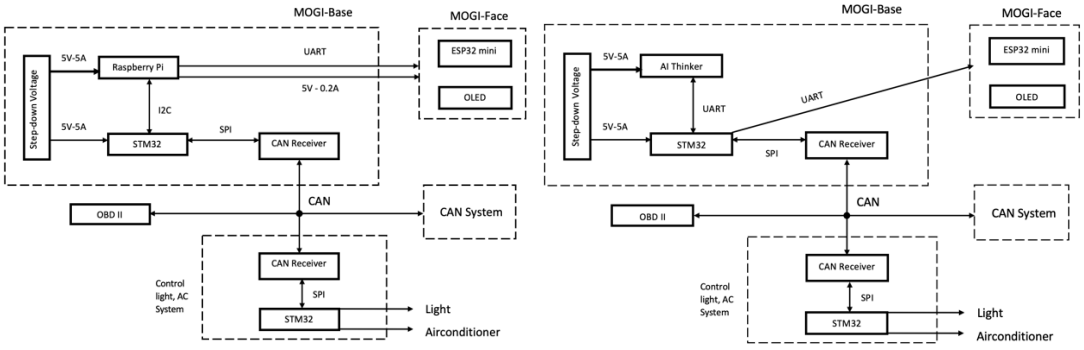
c. Detailed Technical Architecture

AutoMate connects directly to the car's internal network (CAN bus) - just like how built-in systems in modern cars work.

At the center of the **Standard version** is a Raspberry Pi 5. It listens to your voice, processes commands offline, and sends them to a small STM32 chip. From there, the STM32 talks to the car's systems (like lights or air conditioning) through CAN -using a CAN transceiver module. Meanwhile, the **Lite version** replaces the Raspberry Pi with an ESP32. It still processes voice offline, just with fewer features -perfect for simpler control needs.

Both versions share the same "robot key" - a small figure on your dashboard that lights up and listens when you speak.

In short: AutoMate works like a smart bridge between your voice and your car's systems, without needing any internet or cloud service.



System diagram for Standard & Lite Versions

d. Physical Design: Innovation and Uniqueness

AutoMate isn't just a voice system - it has a face.

At the center of the experience is our **robot key**: a small, dashboard-mounted figure that lights up, listens, and responds when you speak. It's magnetic, easy to place, and instantly recognizable.

When it's on the base, the system activates. When you remove it, the system powers down - simple, secure, and satisfying.

The robot key brings personality to the product. It doesn't just blink or beep - it expresses. Through LED eyes or a small screen, it reacts in real time. In the Standard version, it can even speak back and show emotions. This makes AutoMate feel more like a co-pilot than a control panel.

We designed it to be compact, customizable, and fun - because drivers don't just want features, they want connection. You can switch its appearance, change its voice, or give it a new mood.

Everything about the physical design supports one goal: **Make voice control feel natural, human, and part of the car.**

e. Improvements and Efficiency

Traditional in-car controls are slow and distracting. Touchscreens, switches, or pulling out your phone - it all breaks focus.

AutoMate changes that. Just speak, and your car responds - instantly, offline, and without relying on apps or internet. It's faster, safer, and feels natural.

Smart car features today mostly come with expensive vehicles. AutoMate brings that same convenience to everyday cars -even older ones.

Both versions - Lite and Standard -give drivers the same core benefit: hands-free control that works anytime, anywhere -and can be installed on most cars, regardless of age or brand.

And because it's simple to install and easy to upgrade, you don't need a technician. Plus, the robot key makes the experience feel personal -not just functional.

AutoMate isn't just smarter tech. It's a better way to drive.

4. PROTOTYPE

Prototypes effectively demonstrate the features and design characteristics of the product/service, providing a clear and compelling response to the challenge presented by the business.

Prototypes showcase creative innovation, incorporating unique design elements or new functionalities that improve existing solutions.

A video presentation of a prototype clearly illustrates how the product/service operates in a real-world situation.

We've completed working prototypes for both the Lite and Standard versions of AutoMate.

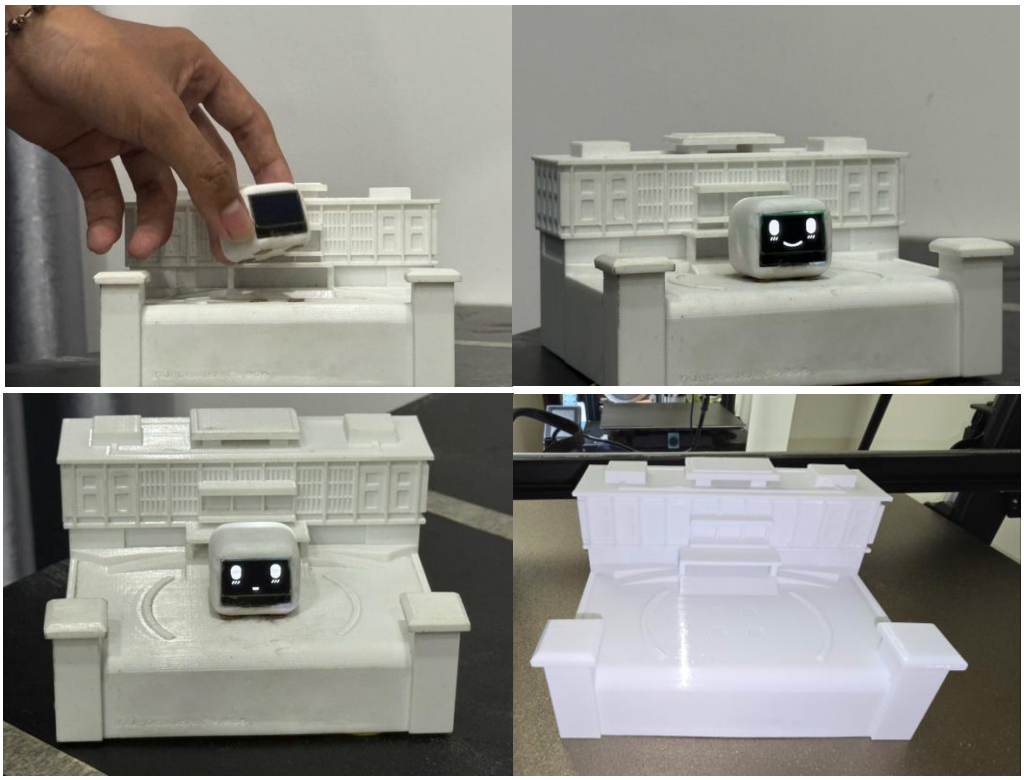
Both versions have been installed and tested on a real vehicle, successfully running basic functions like turning lights and air conditioning on and off -fully offline, using voice commands.

The robot key has also been tested. Its magnetic base triggers system activation, and the face - displayed on a small OLED screen -reacts with expressions during interaction.
These early results show that the system is functional, stable, and ready for further refinement.
Images below show key moments from our real-car testing process.

Video demo:

https://drive.google.com/drive/folders/1cHv5UKUGakXUx7yS0Vw_EhBKDDAO0e7

Images: Mogi 843 Celebrates April 30 – Southern Liberation and National Reunification Day



5. MARKET FEASIBILITY

Defining the target market for the product/service using relevant data and research
Analyzing competition and defining clearly competitive advantages using a competitive matrix
Clearly describes the approach to acquiring both initial and subsequent customers.
Having appropriate distribution, marketing, and sales strategies to capitalize on market opportunities. (*)

a. Real Market Needs

Vietnam has over 5 million cars on the road -and most still don't have smart features. Drivers still reach for buttons or phones just to do basic things like switching on the lights or adjusting the AC. That's not just annoying - it's dangerous. Just two seconds of distraction can double the chance of a crash (AAA Foundation), and in 2024, Vietnam recorded nearly 10,000 traffic deaths. To reduce risks, the government now fines drivers up to 6 million VND for using phones while driving (Decree 168/2024).

While some newer or high-end cars offer voice assistants, they rely on mobile data -and signal isn't always stable, especially in rural areas. Millions of drivers are left without a safe, reliable, hands-free solution. **AutoMate was built to fix that.**

b. Market Size Estimation

Vietnam's car ownership is rising steadily, with recent surveys showing that around **9% of households now own a car** (Xinhua, 2025). Additionally, the automotive market is expected to continue growing, despite short-term challenges (Vietnam News Agency, 2025).

Based on this and internal research, we estimate AutoMate's market size as follows:

Concept	Estimate	Explanation
TAM - Total Addressable Market	~5 million cars	Cars under 9 seats circulating (~3.45 million[1]) and expected to be sold in Vietnam (~500.000-600.000/year) within 3-5 years.[2]
SAM - Serviceable Addressable Market	~2 million cars	Vehicles without built-in virtual assistants or owners seeking upgrades
SOM - Serviceable Obtainable Market	6,000 units	1% of SAM as a realistic entry goal for the first 3 years

c. Transition Opportunity (EV & Policy Trends)

Vietnam's auto market is transforming fast - EV sales are rising, policies are pushing green mobility, and over 5 million cars remain largely offline. This shift opens up a massive opportunity for AutoMate.

Market Evolution: The overall auto market is growing, with a projected CAGR of 10.32% (2024-2029). Crucially, EV sales are rising fast – an estimated 18,000 units by 2025 and aiming for 10% of total car sales by 2030. EVs also mean fewer physical buttons, making voice control essential, not just a luxury.

Government Support: The government actively promotes green transport. Key policies include:

- **Tax Breaks:** Battery EVs get significant registration fee exemptions (3 years free, then 50% off for 2 more) and much lower special consumption taxes (e.g., 1% for 9-seaters until late 2027).
- **Green Push:** Hanoi's plan to restrict gasoline motorbikes from 2026 clearly shows a national move towards greener transport.

Growth in Numbers: Here's a quick look at the market's trajectory:

	2023 Q1	**2024 Q1**	**2025 Q1**	**Change (2024→2025)**
VAMA total vehicle sales	~70,392 units	~58,165 units (↓17%)	**72,249 units (↑24%)**	+24%

[1] Xinhua. (2025, January 15). *9 pct of households in Vietnam own cars: Survey*. https://english.news.cn/20250115/b505ffda95144d44a48b97b393f62b6b/c.html

[2] Vietnam News Agency. (2025, January 25). *Vietnam's automobile industry to face multiple challenges in 2025*. VietnamPlus. https://en.vietnamplus.vn/vietnams-automobile-industry-to-face-multiple-challenges-in-2025-post308759.vnp

Passenger car sales (VAMA members)	~52,712 units	~41,858 units (↓21%)	**51,089 units (↑22%)**	+22%
VinFast BEV domestic deliveries	-	-	**35,100 units**	-
EV + Hybrid share of total car sales	~15–20%	~15–20% (est.)	~15–20% (forecast)	Stable
EV market size (2025 value est.)	-	-	**USD 3.12 billion**	CAGR ~18.9% to 2030

Sources: VAMA, Vietnam News Agency, Reuters, Mordor Intelligence (2023–2025)

These strong trends and government support create an ideal environment for EV growth and related tech. AutoMate, being offline, affordable, and hardware-integrated, is perfectly positioned to serve both traditional cars and new EVs, without relying on internet or high prices.

d. Target Customers

AutoMate focuses on two core user groups:

Everyday drivers - owners of non-luxury cars who want smarter, safer control without buying a new vehicle. They often deal with distractions, app fatigue, or poor connectivity. AutoMate **Lite** offers them plug-and-play, offline voice control for essential functions like lights and AC - with no setup or internet needed.

Tech-savvy drivers & EV owners - early adopters and retrofit enthusiasts who expect deeper integration. AutoMate **Standard** connects directly to the CAN bus, enabling responsive voice control over advanced in-car systems - without relying on cloud platforms.

Together, these segments cover a fast-growing space: 5M+ vehicles in use, 35K+ EVs delivered in Q1/2025, and a USD 6B retrofit market projected by 2028.

AutoMate meets both needs today - and is ready to expand toward fleet users, ride-hailing drivers, and even premium car owners who seek better voice control, native Vietnamese support, or offline reliability that their factory systems lack.

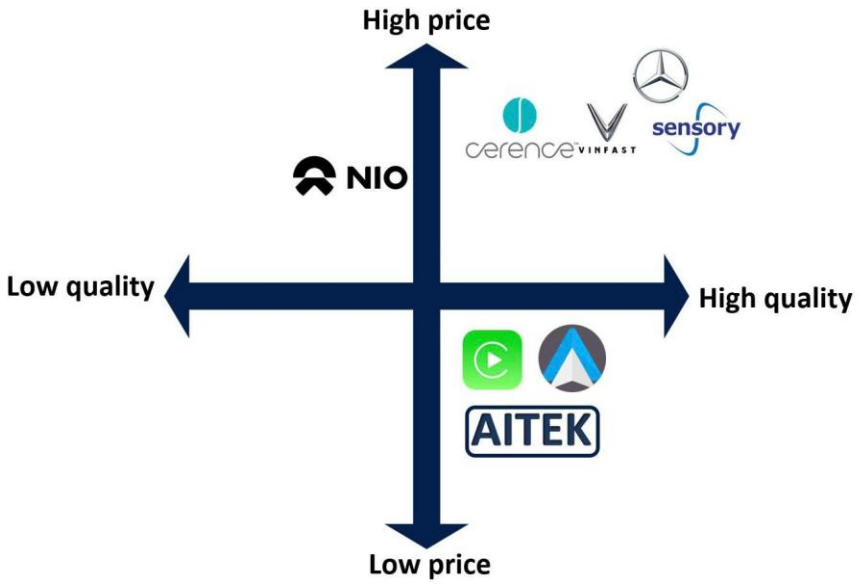
e. Competition & Unique Advantages

Criteria	**AITEK MOGI**	**VinFast ViVi**	**NOMI / Chinese EVs**	**Mercedes MBUX**
Offline capability	✓ Full	– Partial	– Basic offline only	– Depends on model
Hardware-level control	– Via CAN/hardware	✓ Integrated, but not customizable	– Predefined, limited control	– Partial per model
Retrofit / Old car support	✓ Plug-and-play, any car	✗ Only on VinFast	✗ Built-in only	✗ Only on Mercedes
Vietnamese voice support	✓ Native, context-aware	✓ Strong, system-integrated	– Basic Vietnamese UI	– Limited or unavailable

User installation	✓ User-installable	✗ Factory-installed only	✗ Not user-customizable	✗ Dealer-installed only
Reputation	✗ Initially	✓ Popular in Viet Nam	✓ Popular in Chinese	✓ Popular Brand
Estimated cost	✓ Low (1–3M VND)	✗ Bundled in car price	✗ Included in vehicle price	✗ Premium/luxury only
Best suited for...	Drivers upgrading any vehicle	VinFast owners	EV drivers valuing UI aesthetics	High-end infotainment users

Table X. Functional comparison of AutoMate and current in-car voice systems using key user-focused criteria

AutoMate offers a unique balance: offline reliability, hardware-level control, and retrofit accessibility - meeting the needs of drivers underserved by current cloud-based or brand-locked systems.



f. Go-to-market & Customer Acquisition

AutoMate will launch with a focused strategy targeting users who value practicality, safety, and upgradeability - but currently lack access to smart in-car systems.

Launch Focus

We'll start with everyday drivers and early EV adopters in urban centers like Hanoi and Ho Chi Minh City - especially those driving mid-range cars or entry-level EVs without built-in voice assistants.

Sales & Distribution

- **Online channels:** Shopee, Tiki, Facebook Marketplace, and TikTok Shop.
- **Offline partnerships:** Accessory shops, car care centers, and retrofit garages.
- **B2B leads:** Ride-hailing drivers, taxi fleets, and EV showrooms seeking bundled options.

Acquisition Strategy

- **Pilot program:** Offer early testers (Grab/Be drivers, car clubs) discounted units in exchange for feedback and visibility.
- **Referral loop:** Incentivize word-of-mouth via in-app codes or partner garages.
- **Community-first:** Engage car modification forums, Facebook groups, and EV fan pages.
- **Local demo days:** On-site installs & test drives at garage partners.

6. BUSINESS MODEL

The value proposition is presented and explained.

The revenue model is well-defined, highly potential, and testable.

The business model structure and key assumptions are clearly defined and feasible.

Determining LTV (Lifetime Value per Customer) and COCA (Cost of Customer-Acquisition) shows a lot of potential. (*)

Forecasts for revenue, costs, and profits for the 3-year plan are reasonable.

Key financial metrics (profit margin, break-even point, ROI, etc.) show good growth potential. (*)

AutoMate introduces an innovative yet practical business model, focusing on bridging the technological gap for non-smart vehicles through a cost-effective, modular, and personalized dashboard assistant. The product does not simply provide functionality; it enhances driver safety, satisfaction, and style - particularly for users of older cars or budget vehicles.

a. Value Proposition:

AutoMate offers a practical, offline voice assistant system designed specifically for the retrofit automotive market. Its core value lies in combining safety, affordability, and emotional engagement through a unique hardware-based interface.

- Provides hands-free, offline voice control that enhances driver safety by reducing distraction.
- Operates fully without internet, ensuring consistent functionality even in areas with poor connectivity.
- Features a physical robot key that serves as both a user interface and an activation mechanism, adding personality and ease of use.
- Comes in two product versions (Lite and Standard), enabling accessibility for budget users while offering advanced features for experience-driven users.
- Tailored for the Vietnamese market, where many vehicles lack built-in smart systems and owners seek cost-effective upgrade solutions.

b. Product & Pricing Structure

AutoMate is offered in two product tiers-Lite and Standard-targeting distinct user needs while sharing a unified design and voice control platform.

AutoMate Lite

- Designed for budget-conscious drivers and DIY users, particularly those with older or entry-level vehicles

- Built on ESP32, offering basic offline voice control for essential car functions such as lighting and ventilation
- Includes a compact LED-based robot key for activation and system feedback
- Emphasizes affordability, modularity, and ease of installation

AutoMate Standard

- Geared toward tech-forward drivers and ride-hailing professionals seeking advanced interaction
- Combines Raspberry Pi 5 and STM32 controllers with I2C and CAN communication
- Features an expressive robot key with LEDs or a screen and built-in speaker for voice feedback
- Supports deeper integration, including CAN/OBD-II data access and sensor inputs

Pricing Overview

Version	Target Users	Key Features	Estimated Retail Price
Lite	Budget and DIY users	ESP32, basic offline voice, LED robot key	~999,000 VND
Standard	Tech-savvy and service drivers	RPi5 + STM32, CAN/OBD-II, robot key with display/speaker	~2,999,000 VND

Optional Add-ons

Add-on	Description	Estimated Price
Pre-designed robot key models	Themed designs for personalization	~249,000 VND
Custom robot key (bespoke design)	User-requested shape/colors/materials	~799,000 – 999,000 VND
Software upgrade packs	Voice packs, advanced command libraries	~349,000 VND

This pricing structure supports a "buy-once, upgrade optionally" model that encourages lifetime value while remaining accessible to different income levels.

c. Revenue Model & Upsell Strategy

AutoMate applies a hybrid revenue model that prioritizes long-term user ownership. The core model follows a **"Buy once, use forever"** approach, avoiding recurring fees and ensuring consistent offline operation without reliance on cloud services.

- **One-time hardware sales**

AutoMate Lite (~999,000 VND): High-volume entry-level product

AutoMate Standard (~2,999,000 VND): Higher-margin, feature-rich version

- **Add-on product revenue**

Pre-designed robot key models (~249,000 VND)

Bespoke robot key designs (~799,000 – 999,000 VND) for personalization

- **Software upgrade packs (~349,000 VND)**

Includes premium voice packs and extended command libraries

Sold as one-time optional purchases with no subscription required

- **Installation service partnerships**

Revenue from bundled installation packages via garage and workshop partners

- **Upselling strategy**

Lite users can upgrade functionality or transition to Standard over time

Standard users can expand emotional engagement through visual and auditory customization

This revenue strategy ensures accessibility for first-time buyers while allowing continued monetization through optional personalization and upgrades-without compromising the product's core offline, standalone value.

d. LTV/COCA Analysis

AutoMate's business model is built on sustainable unit economics, balancing affordability with long-term value through optional upsells. By offering a one-time purchase product with upgrade flexibility, the startup avoids subscription fatigue while still capturing lifetime revenue from engaged users.

Customer Acquisition Cost (COCA)

- Estimated at ~400,000 VND per user
- Based on projected early-stage spending across digital advertising, social media targeting, and partner commissions
- This figure aligns with acquisition costs reported for smart automotive accessories and consumer IoT products in Vietnam, typically ranging from 300,000–700,000 VND per customer

  (Sources: Do Ventures Vietnam Consumer Report 2022, Statista IoT Market Data)

Lifetime Value (LTV)

LTV is calculated over a 3-year period, assuming no subscription model and partial adoption of add-ons (robot key variants, software upgrades, custom designs). The following table outlines three LTV scenarios:

Profit Contribution	**Pessimistic Scenario**	**Base-Case Scenario**	**Optimistic Scenario**
Profit from Main Product (Price VND 2,999,000, 40% Gross Margin)	1,199,600	1,199,600	1,199,600
Expected Profit from Robot Key (70% GM, Purchase Rate: 20%/40%/55%)	34,860	69,720	95,865
Expected Profit from Design Service (70% GM, Purchase Rate: 2%/5%/8%)	11,186	27,965	44,744
Expected Profit from Software (95% GM, Purchase Rate: 10%/20%/30%)	33,155	66,310	99,465

TOTAL LTV (Gross Profit)	VND 1,278,801	VND 1,363,595	VND 1,439,674

LTV / COCA Ratio

- Pessimistic: **3.2**
- Base case: **3.4**
- Optimistic: **3.6**

These ratios indicate a strong financial foundation, exceeding the benchmark of 3.0 for viable consumer hardware startups.

Key Assumptions

- **Market behavior**: Vietnamese drivers prioritize offline-first, non-subscription models over cloud-dependent systems
- **Add-on adoption rates** (based on early user interviews):
  - Robot key: 20–55%
  - Custom design: 2–8%
  - Software upgrade: 10–30%
- **Gross margins**: ~40% for core hardware, 70–95% for digital and design-based add-ons
- Assumes 3-year customer retention without recurring costs

This structure enables AutoMate to remain accessible while capturing additional value from personalized experiences and technical upgrades.

e. Market Fit

Vietnam's car market remains highly active: in the first half of 2025, over **254,700 vehicles** were sold across all manufacturers, including VAMA members, VinFast, and Hyundai - up 21% from the same period in 2024.

Of these, around **67,500 were EVs**, indicating rising demand for cleaner mobility - while the majority were still mid-range ICE cars, many lacking built-in voice assistants.

Additionally, public interest in retrofit upgrades is growing. Events like **Vietmap x TrollXe 2025** attracted thousands of vehicle owners seeking smart accessories - validating the demand for affordable, plug-and-play solutions like AutoMate.

Image: Nearly 20,000 people took part in the Trollxe Festival & Top-Selling Cars in Vietnam (H1 2025)

f. Financial Analysis

AutoMate's financial plan is built on a three-year roadmap targeting 6,000 units sold (1% SOM). We developed detailed cost and revenue forecasts based on realistic assumptions across product pricing, user adoption, and add-on purchases.

Revenue Forecast

Estimated total revenue is approximately **10.2 billion VND**, based on:

- Lite (~999,000 VND) and Standard (~2,999,000 VND) sales
- Add-on adoption rates (base case): 40% (robot key), 5% (custom design), 20% (software)

AutoMate 3-Year Revenue Forecast (thousand VND)

Revenue								
YEAR	Lite units	Standard units	Lite Revenue	Standard Revenue	Robot Key Revenue	Custom Revenue	Upgrade Revenue	Total revenue
1	1200	300	1.198.800	899.700	29.880	13.485	20.940	2162805
2	1200	750	1.198.800	2.249.250	74.700	33.712,50	52.350	3608812,5
3	1400	950	1.398.600	2.849.050	94.620	42.702,50	66.310	4451282,5

The Standard version contributes the majority of profit due to its higher price and stronger upsell conversion. Revenue growth accelerates annually, aligning with our market expansion plan and increasing brand recognition.

Cost Structure

Operating costs include:

- **Fixed**: personnel, software, depreciation
- **Variable**: materials, logistics, marketing, transaction fees, and tax (estimated at 3% of annual revenue)

AutoMate Cost Structure (3-Year Plan) (thousand VND)

Costs												
YEAR	Lite units	Standard Units	FIXED				VARIABLE					TOTAL
			Utilities	Personel	Depreciation	Software Update	Materials	Tax	Logistic	Marketing	Online Transaction Fee	
1	1200	300	30.000	60.000	20.000	5.000	780.000	64.884	51.000	81.000	24.000	1.115.884
2	1200	750	35.000	80.000	20.000	5.000	1.230.000	108.264	73.500	112.500	33.000	1.697.264
3	1400	950	40.000	100.000	20.000	7.000	1.510.000	133.538	89.500	136.500	40.000	2.076.538

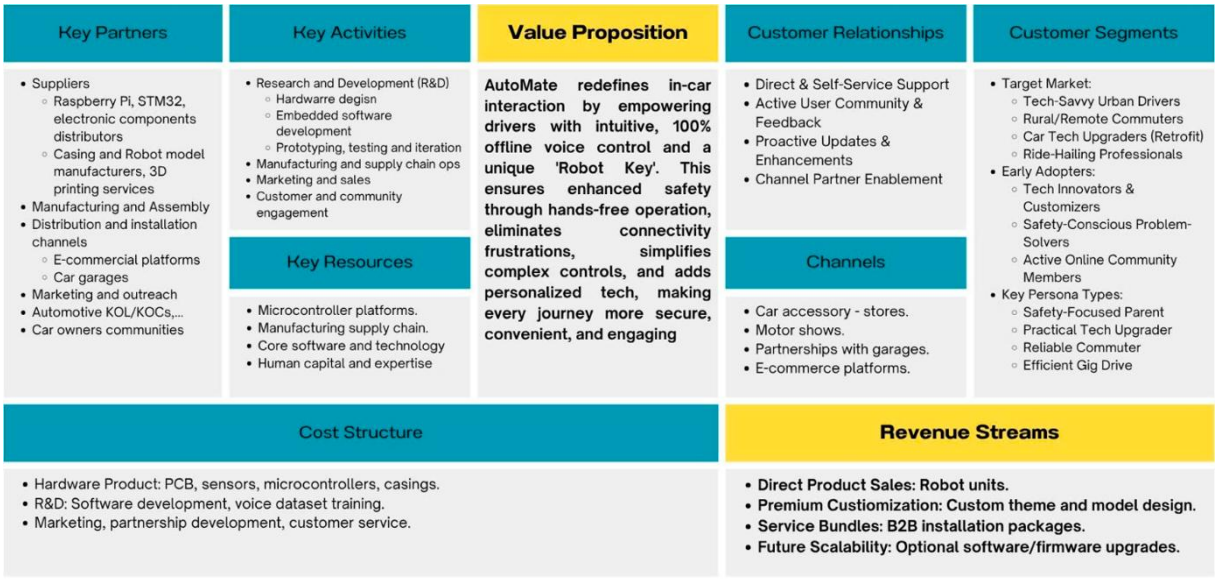
The cost structure is optimized to maintain a gross margin of approximately 40% across product lines, while enabling long-term scalability. Total 3-year operating costs are estimated at **~4.9 billion VND**.

Financial Highlights

Metric	**Value**
Total Revenue (3 years)	~10.2 billion VND
Operating Costs (3 years)	~4.9 billion VND
Initial Investment (R&D + infra)	~300 million VND
Net Profit (3 years)	~5 billion VND
ROI	~96,15%
Payback Period (PP)	~6–8 months
Break-even Volume	~1,700 units (~28%)
LTV/COCA (Standard Version)	3.4

These metrics demonstrate that AutoMate is not only technically viable but also financially compelling. With a lean cost base, strong unit economics, and clear upsell opportunities, the project is well-positioned for both short-term returns and long-term growth.

Business Model Canvas (BMC):



7. INTERNAL ANALYSIS OF THE PROJECT

The project can be presented using the SWOT model

STRENGTHS:

- Offline voice recognition: stable even in poor network zones.
- Friendly, customizable physical form (robot look) with emotional appeal.
- CAN/I2C/UART-based: compatible with both new and old vehicles.
- Modular hardware for easy repair and part replacement.
- Compact and aesthetic design improves interior experience.

WEAKNESSES:

- Production cost per unit remains relatively high for small batches.
- Limited vocabulary set in early-stage voice command system.
- Dependency on CAN protocols may require wiring expertise during installation.
- Requires continuous UX refinement to avoid user fatigue.

OPPORTUNITIES:

- Ride-hailing and car rental sectors rapidly growing.
- Policies supporting startup innovation and local tech manufacturing.
- Emerging awareness about traffic safety and smart mobility.
- Partnerships with universities, vocational schools for training tools.

THREATS:

- Market preference for smartphone-based assistants (Google, Siri).
- Supply chain issues for chips and microcontrollers.
- User skepticism toward aftermarket electronics due to fear of damaging vehicles.
- Copycat products entering the market post-prototype success.

8. DEVELOPMENT STRATEGY

AutoMate's development is structured in 3 clear phases, aligned with product maturity and go-to-market timing.

Phase 1 – Core Functionality (Done)

- Build two hardware versions: Standard (Raspberry Pi 5) and Lite (ESP32).
- Enable voice-controlled hardware commands (e.g., AC, lights).
- Test integration on real vehicles using manual wiring and relays.
- Initial version supports English voice commands offline.

Phase 2 – Voice Expansion & Hardware Refinement (Current)

- Train and deploy Vietnamese voice command model.
- Improve form factor: integrate OLED, feedback UI, casing.
- Optimize response time and multi-device setup.
- Add simple personalization (e.g., robot emotion expressions).

Phase 3 – Scaling & Production

- Small-batch production run for early adopters and garages.
- Improve CAN reading for deeper integration (especially in EVs).
- Add support for OTA firmware updates.
- Prepare for online sales, packaging, certification.

9. HUMAN RESOURCES

Who is involved in the project, and what are the roles and responsibilities of each team member? The startup team demonstrates a passion for long-term direction and commitment to the growth of the business.

AutoMate is currently built by a lean, cross-functional team of engineering students from Hanoi University of Science and Technology. We combine expertise in embedded systems, AI, hardware design, and product development - all driven by a shared passion for building smarter cars for Vietnamese users.

Current Team Roles:

- **Embedded & firmware lead**: Responsible for CAN communication, relay control, and voice-hardware integration
- **AI & voice engineer**: Voice command processing, speech model optimization (English now, Vietnamese in roadmap)
- **Hardware & mechanical lead**: Prototyping, casing, physical design of robot keys and base units
- **Design & user experience**: OLED expression, voice UX flow, plug-and-play feel

Beyond technical execution, the team shares a common long-term vision: to make smart, safe, and personalized driving technology more accessible across Vietnam. Our collaboration goes beyond this competition - we are committed to refining AutoMate into a commercially viable product and exploring future extensions such as education kits and AI-driven enhancements.

We believe AutoMate is more than a project - it is the first step in our shared journey as a startup team passionate about solving local problems with practical, human-centered innovation.

We are especially grateful to our mentor, Mr. Pham Tran Dang Quang, Lecturer at the Faculty of Transportation Engineering, for his invaluable guidance. His industry insights and critical feedback helped us refine both our system architecture and user-centric design thinking.

HIGH POTENTIAL TO CONTRIBUTE TO SOCIETY/COMMUNITY?

AutoMate contributes to road safety by reducing driver distraction through hands-free operation. For older or rural users without access to smart features, AutoMate provides an accessible, low-cost way to improve control and vehicle awareness.

It also helps promote digital equity by ensuring that technological enhancements are not exclusive to high-end vehicles. For communities with poor internet access, this offline solution empowers more inclusive use of technology.

In the educational space, AutoMate can be adapted as a teaching aid for embedded systems, voice control programming, or vehicle diagnostics, supporting STEM learning at universities and vocational schools.

Furthermore, the robot's friendly form encourages driver mental well-being by introducing a humanized companion on the road - a small but meaningful contribution in a stressful driving culture.

THE TEAM'S ASPIRATIONS AND OBJECTIVES IN SUBMITTING THE PROJECT TO THE COMPETITION

AutoMate is more than a technical project - it reflects our team's vision of accessible, inclusive, and humanized vehicle technology. By participating in Bach Khoa Innovation 2025, we seek not only recognition but also mentorship, collaboration, and real-world validation.

We hope to turn AutoMate into a tangible solution used on Vietnamese roads, especially in everyday cars that are often overlooked by the tech industry. The competition gives us a platform to connect with investors, mentors, and fellow innovators.

Long-term, we aspire to build a Vietnamese product line that proves local creativity can solve local challenges - and we hope AutoMate will be one of the first steps in that journey.

Note: (*) Criteria are encouraged, but not mandatory.