Grab: A Product Case Study

Contents

Snapshot

Grab is the leading superapp in Southeast Asia, used across 8 countries and 500 cities, predominantly for rides, ordering food and online payments. Analyzing Grab's initial offering, GrabTaxi, we see how specific strategies to deliver this service, have also morphed into being the backbone for Grab's other services, and allowed it to become the superapp that it is today.

- **Navigation Solutions:** GrabMaps addresses Southeast Asia's unique navigation challenges, especially the accurate mapping of smaller roads essential for local travel. Utilising extensive ride data, community feedback and their own proprietary cameras, it provides precise, real-time maps, to improve the quality of its services, as well as being leveraged by other third parties such as Amazon and governments.
- **Driver-Partner Solutions:** Grab constructed a flexible model that means their drivers were not full-time employees, enabling rapid expansion without significant fixed costs. While this approach has faced backlash and legal challenges, Grab took on specific strategies to cultivate driver loyalty and enhanced service quality, contributing to the platform's success and creating important income opportunities within the region.
- **Protecting Users:** We explore Grab's safety measures across road, personal, and financial/data aspects. Road safety initiatives include driver fatigue monitoring and educational partnerships, enhancing travel security. Personal safety is bolstered through rigorous driver checks and in-app emergency features. Financial and data protection are secured with GrabDefence, employing AI and device intelligence to prevent fraud, ensuring transactional integrity and user privacy - a tool Grab employs across the platform.

Whilst the features analysed here are not meant to be collectively exhaustive, they highlight how the company's in-house solutions, addressing Southeast Asia's tech challenges, reflect its strategic vision. By developing its own technologies where third-party options fell short, Grab has not only improved regional standards but also set precedents that businesses and governments now follow. This demonstrates Grab's commitment to direct problem-solving and regional leadership through hyperlocal innovation.

Intro

It's one thing to be solving problems for consumers, it's another to be solving problems for businesses, and an entirely different matter to be solving for governments; yet Gab has been helping all three stakeholders simultaneously, creating a flywheel of value creation, whilst keeping the consumers at the core.

Grab is a leading superapp based in Singapore, operating across Southeast Asia (SEA). Founded in 2012, by Anthony Tan and Tan Hooi Ling, the company has snowballed to become a pivotal part of the region's digital economy, providing accessible, safe, and convenient solutions for millions of users.

For consumers, Grab simplifies transportation with GrabTaxi, delivers food consumers want when they want it with GrabFood, and streamlines payments through GrabPay. For businesses, it provides a platform for both small and large merchants to expand their reach via GrabFood and GrabMart, alongside advertising opportunities. For governments, Grab is facilitating digitalization efforts, infrastructure improvements and economic uplift in the region, contributing $5.8 billion to the Southeast Asian economy in 2018 and 2019.

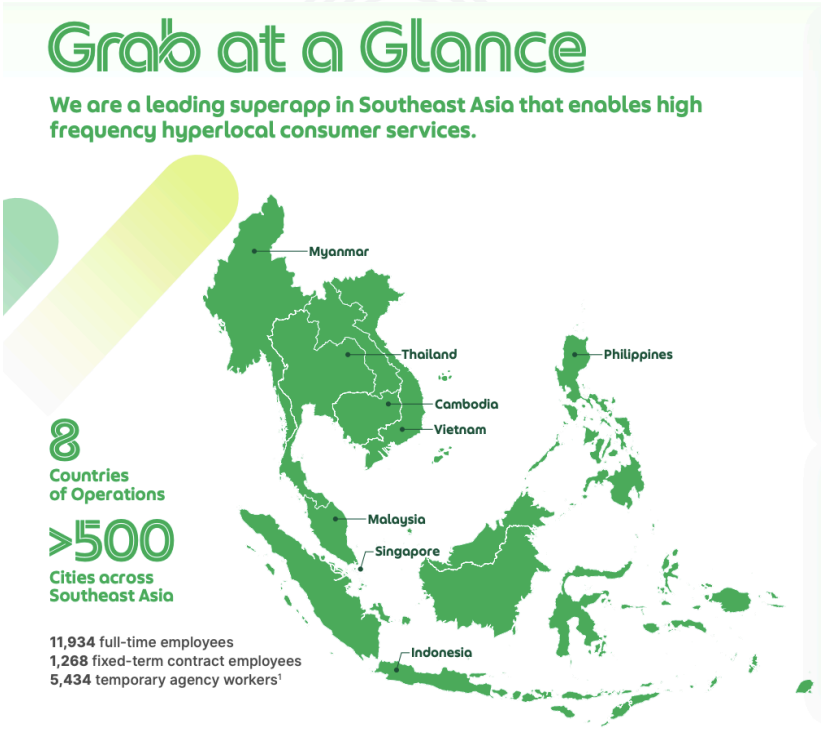

Image 1 - Grab at a Glance, shows the immense size Grab has grown to in 12 years.

Operating in over 500 cities, with over 5 million registered driver-partners and over 5 million merchant-partners, Grab generates over $2.4bn in revenue (FY 2023). Whilst the majority of its revenues come from its delivery services (incl. GrabFood) (50% of revenue), it was Grab's

mobility service (GrabTaxi) that was the foundation of the app back in 2012 (which now represents around 37% of its revenue, FY 2023).

Given the vast scope of the superapp, we aimed to structure the case study in a manner that is succinct but still as comprehensive as possible. We chose to spotlight GrabTaxi, the platform's foundational service, to explore how its strategic initiatives not only bolster its operations but also provide synergy for its financial and delivery services.

Namely, the essence of ride-hailing products is being able to transport users to their destinations with maximum accuracy and efficiency - with efficiency being made up of time, cost and safety. We'll look at how Grab solves for these parameters by analysing three angles: its navigation technologies, its business model with driver-partners and its approach to safety, and understand these implications in the broader context of the superapp.

I hope you enjoy the read.

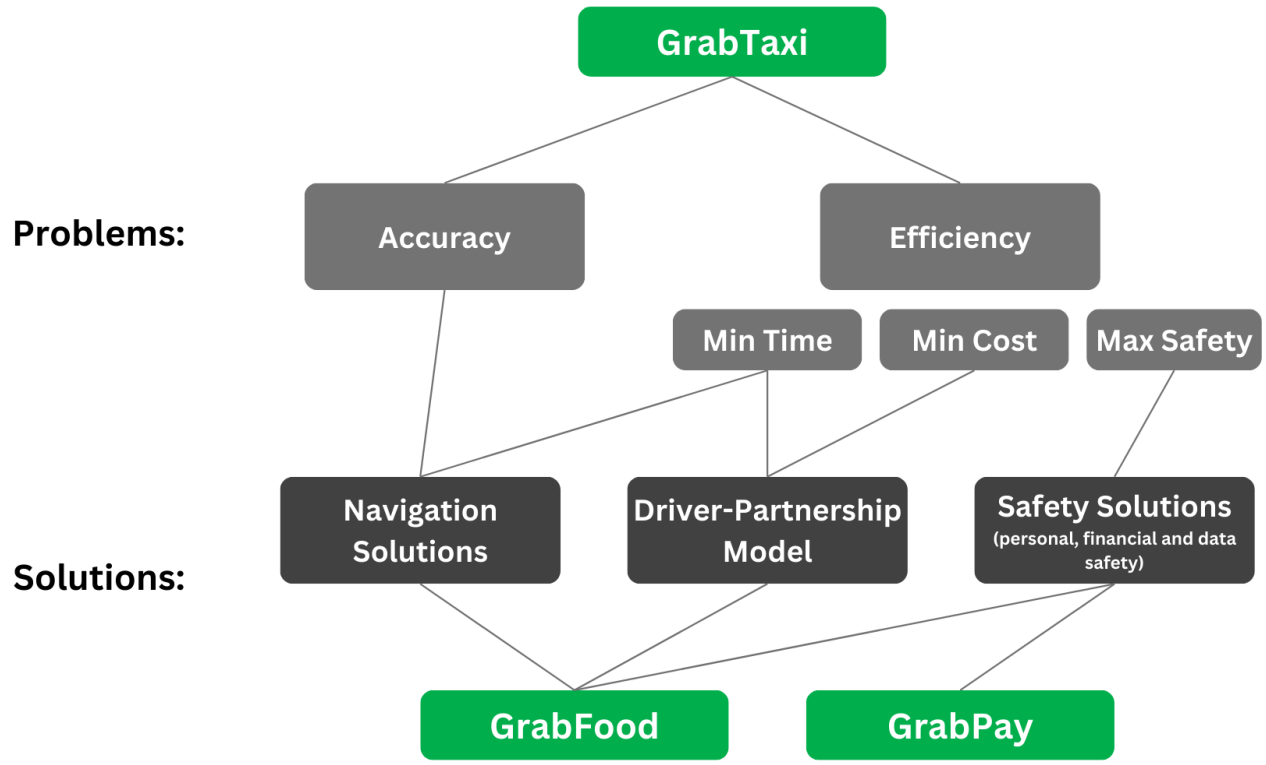

Image 2 - Framework of this case analysis. We focus on three core strategies that Grab takes to deliver its GrabTaxi service, and how these same strategies also form the foundation of the other main services on the platform.

Navigation Solutions

The accuracy of GPS location is perhaps something we take for granted in developed countries, but it was a real challenge in SEA especially in the 2010s.

For ride-hailing apps like Grab, the precision of location services directly impacts the value provided to both passengers and drivers (critical functions like pickups and drop-off points etc).

The primary challenge in the SEA was not so much the absence of major road data in established third-party map services but rather the accurate mapping and utilisation of smaller roads / alleyways / 'lorongs' which are commonplace in the region. These minor pathways, crucial for efficient navigation and transportation in densely populated areas, are often underrepresented or outdated in conventional mapping databases.

"Because we couldn't get the quality of service that our consumers and partners deserved, we decided that it was time for us to build and invest in it ourselves."

- Tan Hooi Ling, Co-founder, Grab

GrabMaps

Just 3 years after being founded, Grab invested in its first R+D Centre in Singapore in 2015 and soon began working on developing its mapping infrastructure which would eventually become GrabMaps.

Today, GrabMaps powers over 800 billion API calls per month across all of its services, in all 8 countries it operates in, serving as an absolute cornerstone of its ongoing success in the region, with 4x lower error rate and 10x lower latency than third-party alternatives.

Grab essentially took three important strategies to build GrabMaps:

- Making sense of the massive amounts of data they already had
- A community-based approach
- Developing their own proprietary road-mapping camera

Making Sense of Big Data

With over 3 billion rides taken on Grab, across its 500 cities, and over 3 petabytes of data, Grab has a lot to work with. By analysing the real-time and historical data, Grab is able to gain insights into traffic patterns, road conditions, and urban infrastructure changes. This data includes information such as driver speeds, the most frequented routes, traffic congestion points, and the average time taken to travel between different locations.

The company uses these insights to improve the estimated time of arrival (ETA) predictions and route optimization for both drivers and customers. The data helps in identifying the fastest and

most efficient routes, taking into account current traffic conditions, time of day, and other relevant factors.

Community Driven

In a similar way that Waze leans on its community of users, to provide real-time updates of road closures, accidents etc, GrabMaps leans on its community of users, drivers and merchants to actively update and provide real-time information on new roads, business address changes and other points of interest.

This allows Grab to develop highly accurate and up-to-date maps, without needing to invest significantly into traditional mapping teams or data acquisition.

KartaCam

Grab has also developed their own proprietary map-making camera, which they report is 10x cheaper than market alternatives but still offers the same capabilities.

Grab's fleet of drivers uses these purpose-built cameras on their drives, allowing continuous gathering and uploading of road data to the GrabMap servers, including "street views, GPS data, road conditions, and changing traffic situations".

The data gets analysed and details such as road signs in different languages will get translated and processed by AI to create useful mapping tools - accumulating into what is now over 50 million points of interest in their database.

"We have the largest fleet of drivers and delivery partners in Southeast Asia, (including) cars, two-wheel vehicles and any kind of transportation that you can imagine... Every time a trip or a delivery is made, this data improves our map."

- Mr Philipp Kandal, Grab's head of geo

Image 3 - KartaCam attached to a Grab driver's helmet. It will automatically collect data on roads, congestion and routes as he continues on his deliveries.

The value created from GrabMaps

All this translates to real benefits for users: faster ETAs, smoother journeys, and effortless route planning, making GrabMaps an invaluable tool for navigating Southeast Asia. So much so, that even Amazon Location Services uses GrabMaps data to provide maps, search functionalities, and routing capabilities for applications being developed in Southeast Asia.

The implications of better ETAs is also clear for Grab's other services such as GrabFood or GrabMart - a fundamental tenet that services that allow users to *order what they want, when they want it*, is being able to accurately predict *when* their food/delivery will arrive.

However, GrabMaps has also been able to provide value way beyond this foundational level - specifically providing value for governments and businesses beyond its merchant-partners.

For Businesses:
Many businesses use location-based services, e.g. telcos, logistics and even government agencies. Grab is therefore monetizing their proprietary mapping platform as a B2B solution on three levels:

- Base Map Data: licensing of Grab's extensive Southeast Asian map data, including its over 33 million POIs, detailed road and traffic information, including turn restrictions and speed limits, and high-resolution, wide to 360-degree street-level imagery.
- KartaCam: its proprietary mapping camera, specifically tailored for emerging markets. Offers a cost-effective, high-quality alternative to traditional mapping solutions. It is currently under pilot in Paris, Johannesburg, Dubai, and Seattle.
- Software Development Tools: Grab will provide its maps through Application Programming Interfaces (APIs) and Software Development Kits (SDKs), allowing developers to leverage GrabMaps technology. This includes features such as routing, search, traffic, and navigation, to enhance or develop their own applications and geolocation services.

For Governments and NGOs:
Given that many countries in SEA are still growing, Grab's dataset offers significant insight when it comes to traffic conditions and each country's infrastructure. For example, one of Grab's Public-Private Partnerships is with the World Bank's Open Traffic platform project, where Grab is working with the governments of the Philippines and Malaysia to provide anonymised driver GPS data - "this provides insights to the real-time traffic conditions and allow officers to see the congested areas and make timely and well-informed decisions as to where the traffic should be redirected to".

Grab also partnered with the National University of Singapore (NUS) and its Artificial Intelligence Lab, to leverage Grab's data and develop solutions for urban transportation challenges and smart city planning. The $6 million joint venture is the "first partnership with a business sector for NUS".

Key takeaway

Grab was not happy with the standard market solutions for mapping and navigation in SEA, and as a result, it built its own solution, GrabMaps. Grab then found ways to leverage this solution to improve its value offering of its other services (GrabFood, GrabMart etc), help other businesses (AWS etc), and help governments in the region. As we will see in the rest of the case study, Grab has a habit of *growing the pie*, not just for itself, but for all stakeholders in the broader ecosystem.

Driver-Partner Model

The efficiency of Grab's core service — getting you from A to B — heavily relies on the quantity and quality of the drivers it has at its disposal. This seemingly straightforward aspect of Grab's operations has a number of nuances that deserve highlighting. Here, we'll examine some of Grab's driver-partnership strategies and how they work to deliver (or hinder) that core offering.

The challenge for Grab was to recruit as many drivers as possible and ensure their loyalty to the platform, all while minimizing fixed costs. In response, Grab's driver-partnership model was crafted to maximise driver empowerment. This approach not only improves consumer convenience but also limits Grab's own financial and legal risks.

Driver Empowerment

Grab still took a number of initiatives to ensure that their drivers felt as if they were full-time employees, despite not actually being so. This helped maximise the stickiness of drivers to their platform:

- **Uniform**: By providing uniforms, Grab not only enhanced its brand visibility but also instilled a sense of belonging and pride among its drivers. Uniforms symbolise professionalism and unity, giving drivers a stronger sense of identity and affiliation with the company. Again, it was giving them this *feeling* of being a full-time employee, without actually being one.
- **Financial Support and Incentives**: Grab provides various financial incentives, bonuses, and support programs designed to boost driver income and security. These may include performance-based incentives, subsidies for vehicle maintenance, fuel discounts, and insurance coverage, all aimed at reducing the financial burden on drivers and improving their earnings stability. In fact, in 2018, Grab launched the Better 365 campaign, which improved on four fronts of: greater support, increased earnings, better tools and a stronger community.
- **App Features:** Such as, AutoAccept - Drivers have the option of setting this feature, to automatically accept all jobs that are assigned to them. This helped reduce latency between jobs for drivers, as well as increased pickup rates for passengers.

- **Flexible Work Schedules**: As with most gig economy platforms, Grab allows drivers to choose their own hours, promoting a sense of autonomy and control over their work-life balance.
- **Further Learning:** GrabAcademy included safety training, customer service and health and well-being.

The Half-way Employment Structure

"Although Grab driver was portrayed as a business partner of the company, it had particular vulnerabilities in job security and wage distribution. The position of the company was not equal, especially in determining company policy and the distribution of incentives. The research also concluded that the position of the driver-partners was less favourable because company policies could be enforced without prior communication."

- Extract from a research article on the 'Industrial relations dominance in the ride-sharing transportation apps' in Indonesia, 2020.

Unlike traditional employment models, Grab contracts drivers as independent contractors and does not own its fleet, thereby reducing fixed labour and asset costs. This model provides the company with the flexibility to scale operations up or down in response to market demand (almost like the elastic scalability AWS offered Netflix in our previous case study).

Grab's dominant position in the relationship allowed it to flexibly adjust its service fee structure—the percentage taken from drivers per ride—according to its strategic needs. This flexibility meant that Grab could reduce service fees to incentivise drivers, or even implement negative fees, paying drivers more than what the passengers were charged, depending on the company's goals at the time; or enable Grab to pass on savings to riders, reducing fares to attract more users and balance market demand.

However, this approach has not been without its drawbacks. Whilst it gives Grab capacity flexibility, it also means drivers can be more fickle with their allegiance to Grab. For instance, In 2022, Grab's revenue dropped by 44% due to significant investments in driver incentives, aimed at increasing driver loyalty amid tough competition.

Furthermore, Grab's use of independent contractors has sparked debates and legal challenges, as governments and labour groups push for gig workers to have rights similar to traditional employees. However, Grab maintains a unique advantage in the driver-partner dynamic, an edge that is particularly pronounced in Southeast Asia compared to other regions. In emerging economies, particularly where there is poverty, Grab provides a vital source of income for individuals lacking formal education. Notably, 30% of Grab's driver-partners were unemployed before joining the platform, underscoring its role in offering economic opportunities where they are desperately needed.

In other words, unlike e.g. an Uber driver in London, who is more likely to possess formal education and have access to other job opportunities with comparable pay, a Grab driver in

Southeast Asia is likely more willing to accept Grab's dominant role in the relationship - (particularly when that dominant player is bringing in genuine incentives to improve the quality of work). They are more inclined to endure the potential downsides associated with the company's business model due to fewer alternative employment options - though with the region's rate of growth, how long this will last is questionable.

Quotes from Grab drivers regarding their frustrations:

- "There is little protection. By contract you are just a subcontractor providing logistic service, Grab has no obligation to protect you. Rates can also change any time, all at the whim of Grab. There is PERKESO scheme for gig workers but afaik (as far as I know) you have to handle yourself, Grab won't do it for you."
- "The new incentive scheme, called 'Berlian', or Diamond, is considered very burdensome to drivers. Drivers are required to earn 110 virtual "diamonds" in order to get the incentive or bonus worth IDR 15,000 (Just about 1 USD)."

"*But hey, to be honest, this lack of protection doesn't really feel that different from regular jobs in the real world. Even though we have labour laws, enforcement is weak and employers get away with things all the time, especially in blue-collar industries. It is nearly as good as having no protection at all.*

And you always have to face abuse & micromanagement from your boss; meanwhile being a delivery rider means you have the freedom to set your own pace and schedule with no one looking over your shoulder all the time and whipping you around.

I can totally see why some people opt to do this full-time. It sucks less." - A source from Reddit

The road ahead:

The road ahead for Grab likely involves balancing the gig economy's flexibility with enhanced job security. As Southeast Asia's regulatory landscapes and economies grow, Grab might have to refine its approach to satisfy both regulators and drivers, ensuring fair treatment and sustainable employment practices. Innovations, such as offering employee status to dedicated long-term, high-performing drivers, could forge a new path that combines flexibility with increased worker rights.

Additionally, investing in emerging technologies like driverless cars presents a forward-looking solution, though widespread adoption will depend on regional readiness and public trust. These strategic adjustments and technological investments could help Grab navigate future challenges while maintaining its market leadership.

Safety Solutions

A core reason why millions continue to use Grab across Southeast Asia is the trust and safety they feel when using the service; but this sense of security had to be built over time. It's fair to say that Grab's current success can largely be attributed to the initial trust and safety users experienced with their first service, GrabTaxi.

To be more specific, the feeling of safety can be broken down into three categories:

- Road safety to prevent accidents and ensure secure travel.
- Personal safety to protect against any form of harassment or assault.
- Financial and data safety against fraud and security flaws.

Road Safety

According to the World Health Organization (WHO), 25% of all fatal road traffic accidents globally take place in Southeast Asia.

Direct measures:

Building safer habits with analytics - The app includes a driver fatigue monitoring feature that issues alerts when a driver has been working for extended periods without breaks. Drivers also receive regular reports detailing their driving patterns, including speed, acceleration, and braking, with plans to incorporate more parameters in the future. Following these reports, there has been a 50% decrease in instances of speeding and a 20% reduction in harsh braking and rapid acceleration.

Indirect measures:

In Cambodia and Myanmar, for example, Grab is partnering with the Ministry of Public Works and Transport and local police forces to enhance road safety. The focus is on expanding educational programs and providing additional training for the predominantly informal, localized three-wheel driver community.

Singapore is known for having the highest safety standards in Southeast Asia. By aligning its operations with these top-level benchmarks, Grab has set a strong safety precedent. The company uses Singapore's strict Quality of Service (QoS) guidelines to shape its safety protocols, blending local rules with its own data insights to lower risks. This approach has significantly enhanced road safety, contributing to a safer travel environment throughout the region.

Personal Safety

Direct measures:

Know who you ride with: Enhanced transparency and reassurance are provided through the verification of both passengers and drivers, in addition to thorough background checks for drivers, encompassing criminal history and reviews of inactive driver accounts.

Get help when you need it: The Share My Ride and Emergency SOS features currently available to passengers allow them to share their live location with loved ones. The platform also has a 24/7 safety centre for emergency assistance, to help both riders and drivers.

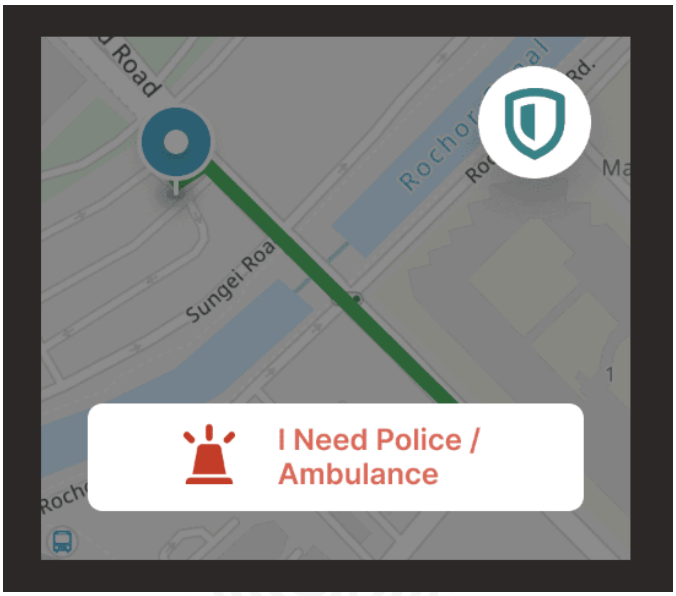

Figure 4 - Screenshot of in-app emergency calling

Indirect measures:

In Thailand, under its Safer Everyday initiative, Grab has partnered with the United Nations Secretary-General's UNiTE campaign. This multi-year effort calls on governments, civil society, women's groups, youth, the private sector, media, and the UN system to join forces in preventing and eradicating violence against women and girls globally.

Grab Philippines is collaborating with the Philippine National Police, the Land Transportation Franchising and Regulatory Board (LTFRB), and the Drug Enforcement Agency to address crime within the transport sector. Additionally, the company aims to train additional drivers to serve as emergency first responders for accidents and provide disaster relief on the roads.

Financial and data safety

Direct Strategies - **GrabDefence**:

ECommerce businesses in SEA lose on average 1.6% of their revenues to fraud, with attempted fraud 12x greater than the global average. As mobile penetration continues to grow in SEA, the opportunities for online fraud are ever-increasing. Similar to GrabMaps, initially the company relied on third-party vendors to help secure the app, but soon found that their solutions were suboptimal for Southeast Asian operations.

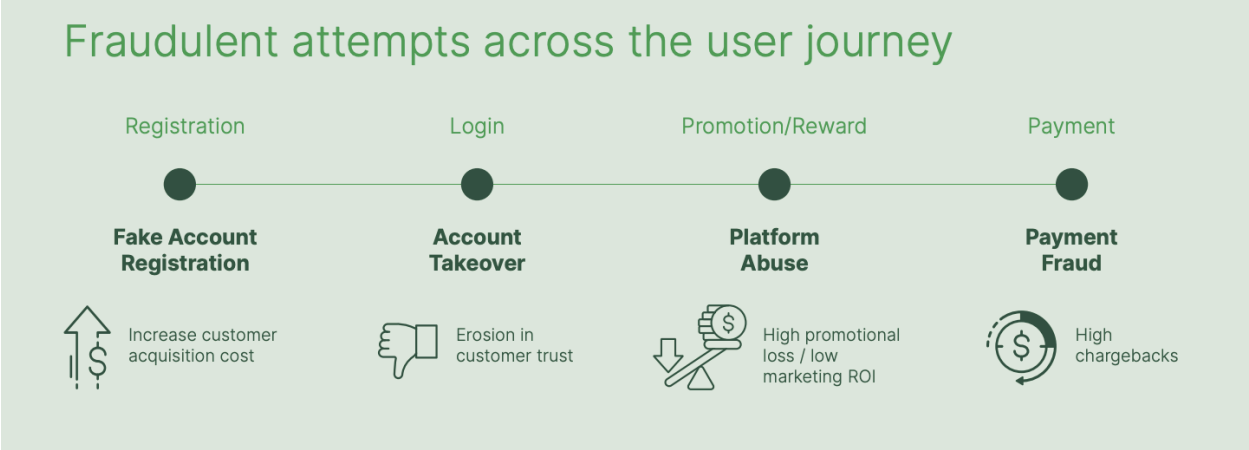

Figure 5 - Diagram of the fraudulent activities that can take place at different points on the Grab app

GrabDefence

"In 2020, this predictive AI proactively defended the 1.9 billion transactions on its platform from malicious activities, and continues to provide a layer of preventative protection" - Grab

GrabDefence is Grab's proprietary fraud detection and prevention system. It comprises of hyperlocal data, patented Guardian device intelligence, a proprietary rule engine, hundreds of fraud experts, and on-the-ground intelligence:

- **Guardian Device Intelligence** by GrabDefence uses device fingerprinting to identify devices through unique configurations, enhancing security against unauthorized access. For instance, if a login attempt is made from a device with an unfamiliar configuration or from a jailbroken device, the system flags it as high-risk. This detailed device information, such as unexpected app behaviour or altered GPS data, is then used to improve AI models, making them more adept at detecting and blocking suspicious activities.

- **AI/ML:** GrabDefence employs AI models that interpret clickstream (digital road mapping of what pages a user visits) and other behavioural data, identifying irregularities indicative of account breaches. These AI insights then inform the Rule Engine, prompting additional security measures as needed.
- **Rules Engine**: A proprietary tool by Grab's cybersecurity team, that consumes data from their ML model, Guardian Device Intellgience etc, and initiates tailored security protocols, enhancing protection based on the specific nature and severity of the detected threats. This dynamic approach ensures a more precise and effective response to potential security breaches.
- **Biometric Verification**: For high-risk login attempts, additional security measures like biometric and facial recognition technologies are implemented to ensure the authenticity of the user.
- **Operations Portal**: The portal's data visualisation tools enable fraud analysts to oversee rule effectiveness, streamline investigations, and hasten the review of suspicious activities or user grievances.

Grab is headstrong in its commitment to a fraud-free superapp. They are currently collaborating with AWS to enhance their fraud detection and security services, with initial pilots showing a 23% increase in fraud detection cases. GrabDefence has become so successful, that it has become its own enterprise unit within the business, allowing Grab to commercialise its anti-fraud suite.

The Results from Safety Initiatives

From 2019 to 2022, there has been a notable 56% decrease in overall incidents per million rides (refer to Figure 6 for more details). Specifically, the company has achieved:

- A 50% reduction in heavy acceleration instances (a reflection of aggressive driving) among its drivers across the region.
- A 68% reduction in speeding incidents, particularly in Malaysia.
- Comparatively, Grab's safety record surpasses the Singapore Taxi Industry Standard, being 1.3 times safer in terms of accidents and 1.8 times safer regarding offences, including harassment and violence.

Additionally, GrabDefence has played a crucial role in maintaining fraud rates below 0.2%, contributing to an 80% reduction in fraud loss specifically within the GrabFood service. While attributing all improvements in safety incidents solely to Grab might not be entirely fair due to other factors like road infrastructure enhancements etc., Grab's contributions have no doubt been significant.

The road ahead:

As the economies in Southeast Asia grow, we'll likely see improvements in safety levels overall, however, cybersecurity concerns will increase. As a result, Grab has set their moonshot targets of eliminating all preventable road incidents and intensifying efforts to combat fraud and enhance digital security across their platform. This dual focus on physical safety and

cybersecurity aims to establish a more secure and reliable environment for both drivers and users, reinforcing Grab's commitment to safety and trust as they navigate the future of mobility and digital transactions in the region.

Grab's solutions, developed in response to Southeast Asia's technological gaps, showcase its overarching strategy. Faced with inefficient third-party solutions to help deliver basic product value, whether mapping or fraud detection etc, Grab built its own - solutions now adopted by others, including businesses and governments. This approach reflects Grab's broader vision: to tackle issues head-on, lead through hyperlocal innovation and enhance standards across the region.

"We will not stop until we reach ZERO
This is just the beginning, and we will continue to elevate transport safety standards across Southeast Asia. We have, and will continue to double down on our investment in safety – from talent to tech – to make everyday services from ride-hailing, to financial services and deliveries, safer and more secure for all.

Goal – ZERO preventable incidents."
- Grab

Supplementary data on safety incidents[43]

	2019	2020	2021	2022 Stats
Overall incidents[44] per million rides	2.556	1.978	1.307	1.1319
Road accidents[45] per million rides	1.593	1.292	0.909	0.930
Moderate accidents[46] per million rides	0.0742	0.0718	0.0771	0.0611
Serious accidents[47] per million rides	0.0211	0.0088	0.0029	0.0019

Figure 6 - Grab's reported incidents per million rides over 2019 - 2022.