Market Research and Competitive Analysis of the Smart Parking Management Systems

Phase 1: Define Goals & Objectives

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for

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Problem Statement: What if drivers are offered parking spots that are more affordable and secure, and parking providers are offered real-time dynamic parking pricing and a more reliable payment system?

Part 1 - Stakeholder Identification

After multiple brainstorming and roundtable discussions, the following list of stakeholders were developed along with rationale as to why they were chosen. The stakeholders underlined are the ones interviewed given time constraints:

Stakeholder	**Reasoning**
Drivers	Drivers would be less stressed if they had a pre-booked access to nearest parking spots to their destinations. Furthermore, the drivers need more features that enhance the security of their vehicles while they are parked.
Parking Garage Chain Owners	It would be beneficial for large parking garage chain owners to include real-time dynamic parking pricing to attract more drivers and adjust the rates for monetary benefits.
Local Parking Owners	Local parking owners would be able to list their parking spots to have an equal chance of attracting drivers when compared to large parking garage chain owners.
Mobile Parking Booking Applications	Already existing parking booking systems (SpotHero) would be able to offer more parking listings that are secured and managed better.
Municipalities (NYC to start with)	The municipalities would have a better managed system that keeps a track of the parking violations and removes the need for payment kiosks for on-street parkings.
Home Owners	Private Home/Lease Owners that have an access to parking spots would benefit from a chance to put their parking spots to be used according to their convenience and schedule. Thus, adding an additional revenue stream for them.

Part 2 - Assumption Identification and Validation

The following provides a list of all assumptions, the applicable stakeholders, and how they were validated or invalidated after interviews.

Applicable Stakeholders	**Assumptions:**	**How were assumptions validated or invalidated:**
Parking Owners (Large & Local); Drivers; Mobile Parking Booking Applications	Drivers have a hard time finding and booking parking spots everywhere.	**Invalidated:** The problem of inadequate parkings is faced most commonly in busy urban areas with huge traffic. The suburban areas do not have this problem as they often have more spots that are not utilised due to low traffic and low density of vehicles in the area.
Municipalities	On-street parkings is always regulated.	**Invalidated:** While people generally pay for the on-street parkings, it is not completely regulated. Very often drivers just park their vehicles without paying or stay in their vehicles while being parked at a parking spot without paying.
Parking Owners (Large & Local); Drivers; Mobile Parking Booking Applications	It is easier to attract drivers if they are offered lower parking rates.	**Invalidated**: It is surprisingly easier to attract parking providers to list their spots to be used. However, parking costs are not the most attractive reason for the drivers. Drivers value security and location of the parking spots more than the costs associated with them.
Home Owners	Private Home/Lease Owners would be open to put their parking spots to be used as it provides an additional source of revenue for them.	**Validated:** Given that they are paid, home owners are more keen to put their parking spots to be used as public parking. However, these private home/lease owners are dubious about the security and accessibility risks associated with other drivers coming and parking at their locations.
Drivers; Mobile Parking Booking Applications	The current Mobile Parking Booking Applications suffer from static parking rates.	**Validated:** Parking rates are static everywhere which leads to drivers often ignoring the listings on mobile applications that offer parking bookings and availability especially in rush hours with heavy traffic and congested areas.

Part 3 - Research Questions

1. **Who are the target customers?**

   1.1) Municipalities & DOTs (e.g., NYC DOT): Seeking smart, scalable solutions to manage dense urban street parking, reduce congestion, and improve enforcement.

   1.2) Private Parking Operators: These include garage owners, lot managers, and real estate firms managing parking for commercial or residential properties—especially in high-demand areas.

   1.3) App Platforms or Aggregators: Companies like SpotHero or ParkWhiz may also be B2B partners or customers, integrating our proposed dynamic detection + enforcement systems with their reservation platform.

   1.4) Drivers (urban commuters & tourists): Particularly those who prefer advance reservations, dynamic pricing options, and app-based payments in chaotic parking environments.

2. **What are their biggest challenges with current parking options?**

   2.1) For municipalities & operators:
   a) Over-parking and under-enforcement due to limited patrol capacity.
   b) Difficulty enforcing time-restricted zones, curbside regulations, and paid parking violations.
   c) No real-time understanding of occupancy patterns, which limits data-driven infrastructure planning.
   d) High costs of installing and maintaining camera-based systems or ground sensors.

   2.2) For drivers:

   a) Lack of visibility into available parking in real time.
   b) Rigid, zone-based pricing that doesn't reflect demand or location accurately.
   c) Uncertainty about enforcement rules, especially for tourists or out-of-town drivers.
   d) No integrated solution that allows spot reservation + auto-payment + enforcement alerts in one place.

3. **What features would make them switch to a new system?**

   3.1) For cities & operators:

   a) Reduced enforcement burden via automated fine generation.
   b) Lower cost than LPR or sensor-based systems.
   c) Seamless integration with existing parking apps or backends.
   d) Option to introduce reservation-based curb management (e.g., NYC's growing push for smart curb zones).

3.2) For drivers:

a) The ability to reserve a spot in advance, especially for downtown parking.
b) Real-time alerts on pricing changes, nearing time limits, or availability nearby.
c) One-tap payment with automatic billing via RFID, mobile wallet, or app account.
d) A booking and parking experience that feels less intrusive and more trustworthy.

4. **Who are the current competitors and how do they operate?**

Competitor	How They Operate	Limitations
SpotHero / ParkWhiz	Aggregators that let drivers book parking in advance at garages and lots. They rely on garage operator availability and manual enforcement.	No real-time detection or auto-enforcement. Requires lot owners to input inventory manually. No curbside integration.
ParkMobile / Passport	Focused on on-street metered parking, enabling app-based time tracking and payments. Paired with license plate enforcement or parking meter data.	Still relies just on cameras or meter readers. Doesn't support reservations or auto-fines.
T2 Systems / Flowbird	Provides LPR-based hardware + software for enforcement & pricing. Often used by universities, cities.	High infrastructure cost, heavy reliance on plate recognition. Limited privacy controls.
Bosch / Urbiotica	Sensor-based smart parking using ground sensors for vehicle detection. Common in Europe, gaining traction in US cities.	Expensive to scale, especially in dense cities with dynamic curb usage.