Raetor Capital

The On-demand Transportation Solution PRT is a Potential $31-58 Billion Investment Gain Opportunity

Personal Rapid Transit (PRT) Research

"By 2030, we'll see (mobility) developments that may be as profound as those of a hundred years before. Radical changes, 'horses-to-cars' changes … are coming, even faster this time.

The characteristics of mobility at the second great inflection point will be significantly, not just marginally, better. Electric and autonomous vehicles… intelligent road networks… new customer interfaces and services, and a dramatically different competitive landscape in which tech giants, start-ups, and OEMs mix and mingle are just a few of the shifts in store.

Radical improvements in cost-effectiveness, convenience, experience, safety, and environmental impact will, taken together, disrupt myriad business models on an almost inconceivable scale."

McKinsey & Company
Mobility's Second Great Inflection Point, 2019

The public firms comprising the on-demand transportation sector have premium valuations and a combined market capitalization of $500 billion (bn). These firms are in aggregate unprofitable.

In contrast with these firms, Personal Rapid Transit (PRT), an established on-demand transit mode (SAEV) has attracted less than $0.5 bn of investment and has firm valuations that are half the level of the on-demand public peers. Several of these firms are undercapitalized and raising equity funding in 2021.

However, PRT has an advanced global project pipeline of $82 bn of which we expect $14 bn to successfully close (18 PRT projects are currently either under construction, contracted or under bid).

The result:

Praetor Capital Research Finding:

The on-demand transportation solution PRT is a potential $31-58 bn investment gain opportunity (midpoint ~$45 bn), representing shareholder returns in the thousands of percent

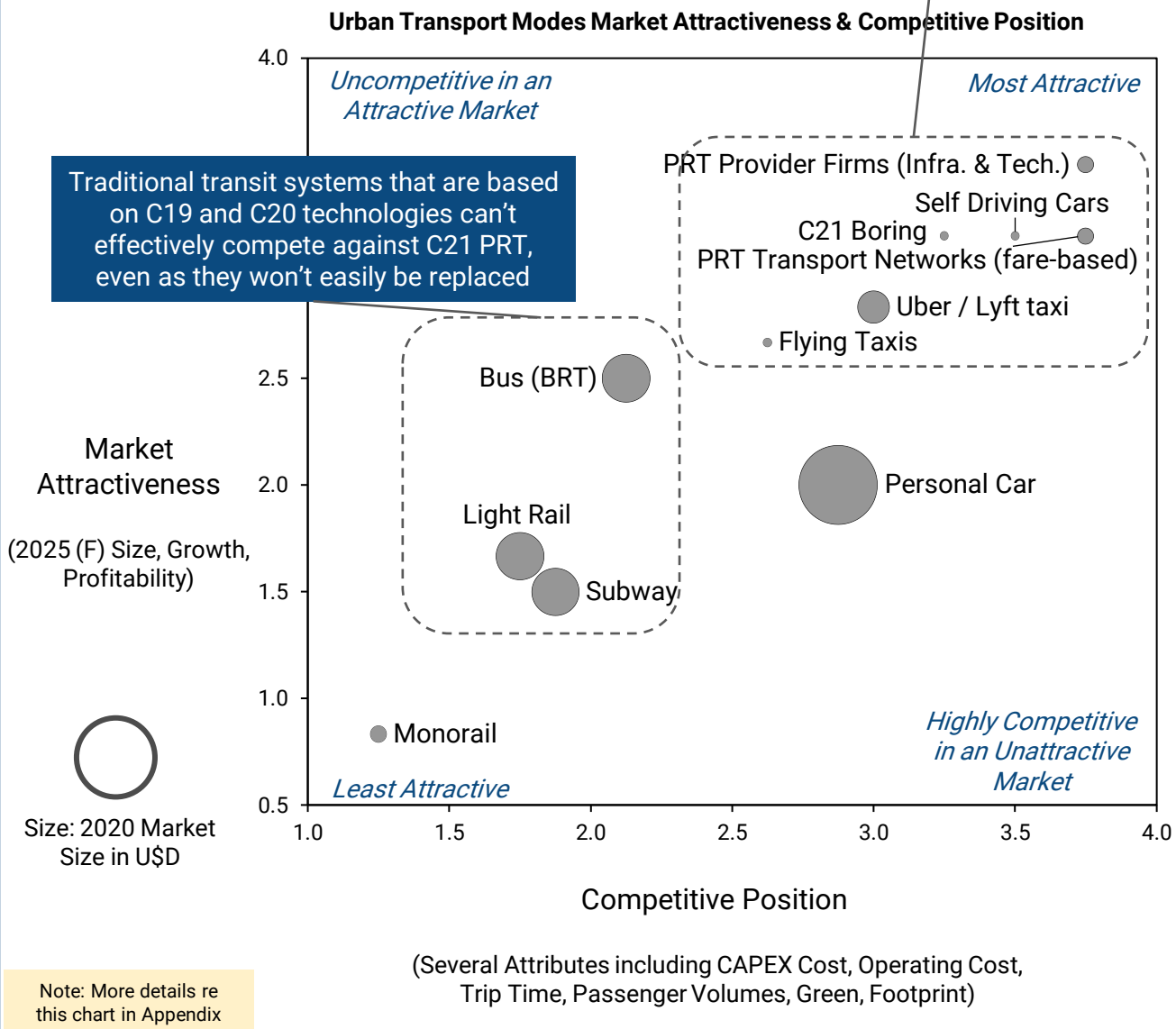
Why?

1	Because PRT's cost advantage and recent technology advances make it an attractive infrastructure investment
2	Because PRT has several other competitive advantages vs. urban transit modes like cars, BRT, light rail and subways
3	Because PRT is a solution to the global urban transportation crisis, resulting in a market opportunity of over $1.5 trillion p.a.
4	Because there are attractive, and potentially highly profitable, entry points into the ~$45 bn value gap / opportunity
5	Because resources and one large PRT project will overcome the reasons for the current value gap / opportunity
6	Because we expect several PRT firms with smart regional strategies to prevail, but consolidation will create value for many
7	Because the risks of PRT can be addressed by suitable financial instruments and a partnership approach

The data and findings of this Research (the $31 to 58 bn value gap or ~45 bn) can be summarized on one traditional strategy chart: the Market Attractiveness & Competitive Position Matrix

- PRT Will compete effectively against the highly capitalized C21 on-demand transportation options
- PRT Provider firms are neither well capitalized, nor valued similarly, but this research demonstrates they should be

Traditional transit systems that are based on C19 and C20 technologies can't effectively compete against C21 PRT, even as they won't easily be replaced



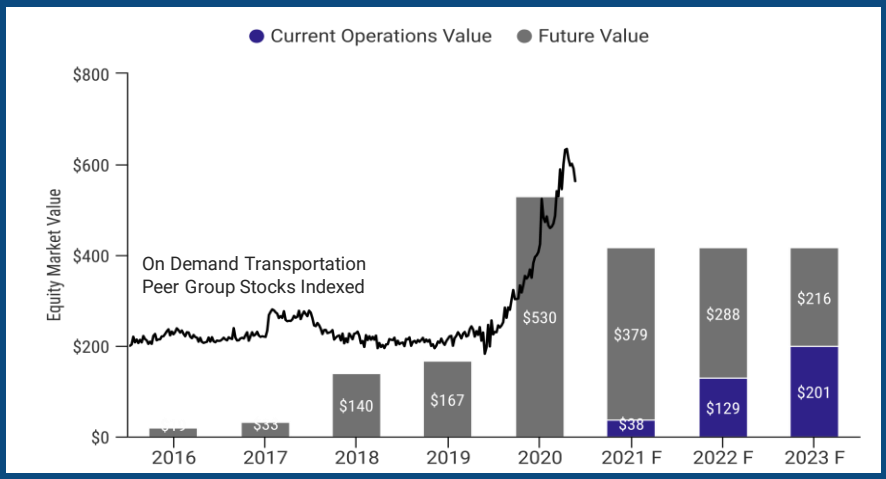
Note: More details re this chart in Appendix

INTRODUCTION TO THE PRT VALUE OPPORTUNITY/GAP

Investors are paying increasing attention to, and investing in, the emerging mobility ecosystem. This domain includes the traditional OEM, autonomous driving, battery, AV mapping, sensor and EV (electric vehicle) charging segments. Over a thousand early-stage mobility companies have received ~$200 m (million) investment since 2010.

On-demand transportation is a part of this mobility ecosystem and one of the best-performing segments in transportation investing. This includes ride-hailing app providers like Uber and Lyft, multi-mode majors like BYD, on-demand logistics like LaLamove and EasyVan and micromobility providers like urban bike and scooter rentals (e.g. Lime). The industry revenue is estimated at USD 126 billion to 142 billion currently and expected to grow at 15 to 20% per annum to 2025.

Figure 1) On-demand Transportation Peers
Indexed Equity Market Performance and Current Value vs. Future Value



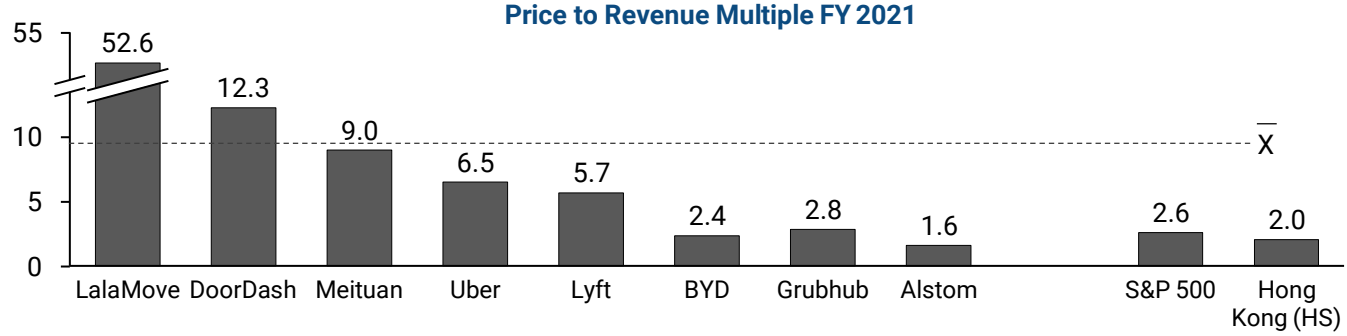
Note: Praetor removed non-transport divisions from BYD and Meituan and pro-rated the market capitalization

The group of market listed on-demand transport providers has performed well from 2016 to 2021 and produced a ~275% stock market return in comparison with the S&P 500's ~116% return (Figure 1).

The aggregate adjusted public stock valuations of $420 bn is entirely based on future growth potential currently (Financial Year 2020), reflecting the strong forecast expansion of the segment and expected future profitability. Risk approximates the market (β is 1.1).

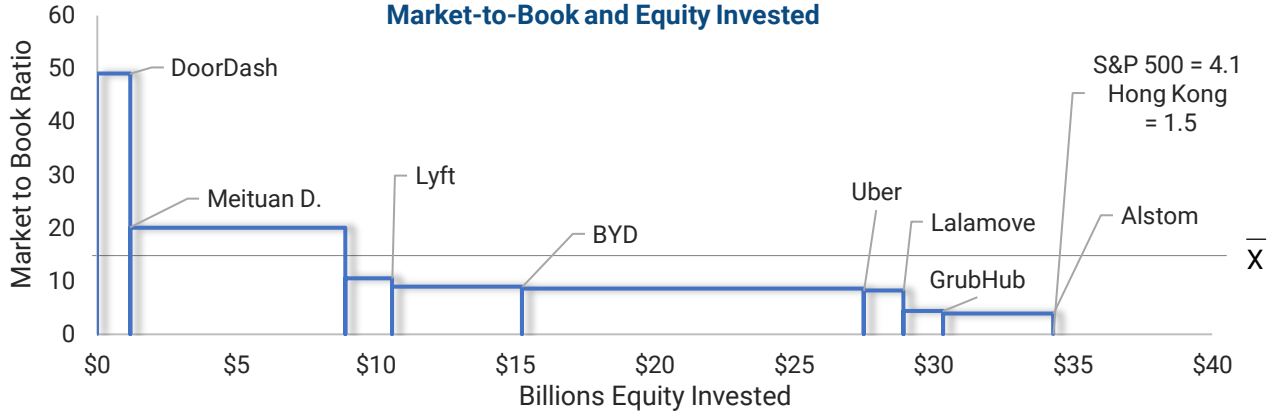
The Price-to-Revenue multiple is an effective gauge of early-stage company value that doesn't rely on free cash flow and profit, and hence fits this group. The high market expectation for this peer group is also reflected in the average Price-to- Revenue multiple of 9.7x, illustrated in Figure 2.

Figure 2) On-Demand Transportation Peers*
Price to Revenue Multiple FY 2021



**Note that Tesla was intentionally excluded from this group because it's an auto major and because of its large size. Its financial characteristics would have, in effect, overwhelmed the rest of the group. If Tesla was included, these valuation metrics would be higher*

Figure 3) On-Demand Transportation Peers
Market-to-Book and Equity Invested



The Market-to-Book ratio of the peers illustrates a similarly high expectation or premium valuation position (Figure 3). A ratio value of 1 indicates the market value of equity matches the equity capital invested. An average peer value of ~14 reflects significant value creation, well above the S&P 500 of ~4.1 and Hong Kong's Hang Seng value of ~1.5. The adjusted book equity capital of this group – excluding prior loss write-downs - is ~$34 billion.

In contrast to early stage on-demand transportation peers, Personal Rapid Transit or PRT provider firms have yet to attract a billion dollars of investment several decades into PRT's technology development with functional PRT tracks on three continents.

PRT Companies - which fall into the category of shared autonomous electric vehicles (SAEV) - have attracted approximately one 1/50th of the investment in public on-demand transportation firms (Figure 4; the X scale is 1/10th of the above Figure 3). The average PRT firm valuation* (market-to-book) is under half of their on-demand transportation peers (~7 vs. ~14). Several of these companies are undercapitalized and plan to raise equity capital in 2021, of which 3 are raising capital currently^.

There are two possibilities relating to both low PRT investment and firm valuations: Either PRT is unattractive as a solution and investment. Or PRT is a significant investment opportunity.

Figure 4) PRT Provider Firms
Market-to-Book & Equity Invested

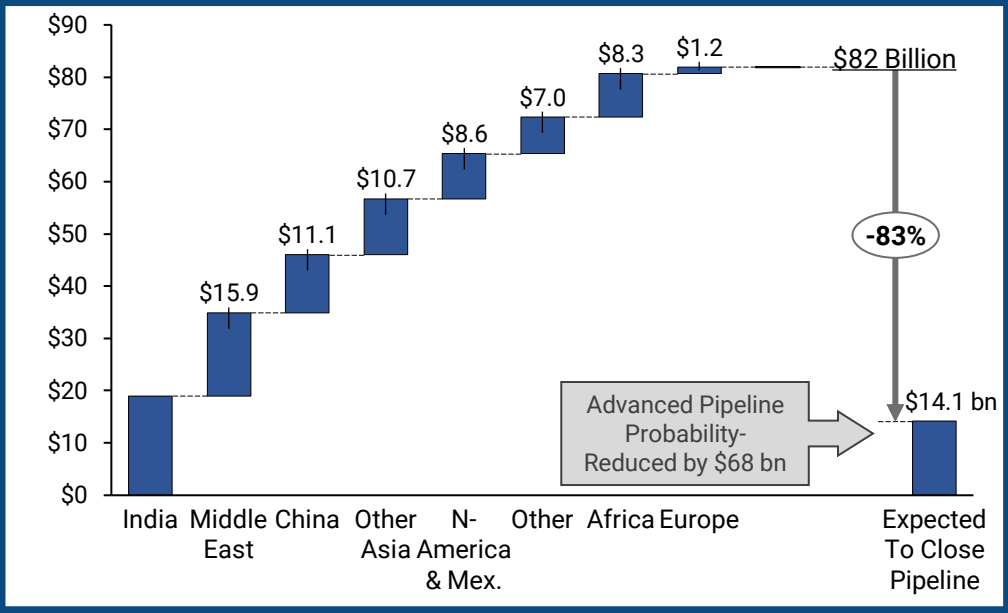
Futran Ultra PRT Transit X

**All the PRT companies are privately held. If their valuations haven't been provided to Praetor Capital, they have been estimated.*
^ ModuTram, Vuba and Futran are raising capital currently. Request specifics directly from Praetor - they are not disclosed in this research

Praetor Capital's perspective: The answer is PRT is an enormous investment opportunity.

The foundation of the PRT investment opportunity is the global Advanced PRT Project Pipeline which totals $82 bn or approximately 250 potential networks that are in the advanced planning stages with a 1/3rd+ chance of being developed.

Figure 5) Advanced PRT Project Pipeline & Reduced to Expected-to-Close PRT Pipeline
In USD Billions



Praetor Capital has held discussions with most active PRT CEOs to develop the perspectives of the research.*

This includes the project-by-project estimate of the $82 bn Advanced PRT Project Pipeline and $14 bn Expected to Close pipeline, indicated in Figure 5.

** Note Praetor has made all efforts to vet this private company group's sales pipeline. However, in a couple of cases the opportunities were provided at the country and region level. SkyTran and The Boring Company did not respond to requests for comment, and we are likely underestimating their collective pipeline by $5+ bn.*

The Advanced PRT Project Pipeline is project CAPEX that translates into revenue for firms that develop the networks, spread over the 3-year project life. The plurality of projects are in India, the Middle East, China and Africa. This PRT pipeline has been developing steadily under the investment media's radar and unknown to many infrastructure and on-demand transportation investors.

Praetor reduces the $82 bn pipeline to the $14 bn Expected to Close PRT Pipeline to conservatively estimate the number of projects that will likely break ground in the coming 3-5 years. This probability adjustment lower is made at the project level considering several factors including PRT company financial position, the project's current status, the location and the views of industry executives.

This $14 bn estimate is neither fiction nor wishful thinking: it includes 13 PRT projects that are contracted or already under construction globally. Some examples are Chengdu Tianfu Airport (China, Ultra MTS), Amsterdam Park & Ride (Netherlands, 2getthere), Las Vegas Loop (USA, Boring Company). These 13 represent ~240 km of PRT track. In addition, there are 5 projects under bid in India totaling ~206 km. Together the 18 constitute ~$3.7+ bn of transportation infrastructure CAPEX. Put differently, we know the likely composition of 18 of the expected ~45 projects of the $14 bn group.

We introduce the research and illustrate it findings with this $3.7 bn PRT project subset.

The $3.7 bn figure of 18 contracted and bidding projects is a portion of a subset, it is 4% of the Advanced PRT Project Pipeline.

However, it will generate an estimated $1.22 bn of revenue and $210 million of EBITDA per annum for early-stage PRT firms. From this we simplistically note:

- This profit is 13% of the forecast 2021 EBITDA of $1.6 bn for the 8 firms that comprise our public on-demand transport segment, which, we recap, has a combined market value of $420 bn. Hence could this subset of PRT be worth $54 bn?
- If we apply the 8 public on-demand transport firm's current LTM revenue multiple (9.7x) to the $1.2 bn annual CAPEX revenue, the PRT subset's value is $12 bn.

How, therefore, is it possible that the entire PRT industry - with its $14 bn of expected projects - is worth less than $2.5 bn?

Praetor Capital Research Finding:

Once a large PRT project demonstrates it's a green, safe, fast and profitable solution for urban transit, PRT will be a potential $31-58 bn investment gain opportunity (midpoint ~$45 bn), representing shareholder returns in the thousands of percent for early participants

This Praetor Capital research provides an overview of the investment opportunity in Personal Rapid Transit (PRT), extrapolating the market size and Expected to Close pipeline into industry financials and shareholder value.

The document intentionally provides a good deal of educational content on why PRT is set to grow rapidly and what supports the project pipeline and significant investor opportunity. We discuss and illustrate historic and yet to be proven costs, project economics, competitiveness, barriers to adoption, industry dynamics, strategy, risk and likely PRT provider firm financial outcomes.

Praetor can't prove the forward-looking assertions on the emerging industry, even as they are based on work done on three continents and both commercial provider and academic research. The future can't be known, and shareholder returns may not ultimately turn out to be in the thousands of percent. However, many hundreds of percent will suffice for most investors.

Praetor Capital aims to provide a firm-agnostic perspective in this research. However - and **disclosure** - the author has investments in PRT early-stage firms and serves as Vuba Corp's CFO. His work has made him into a believer in PRT's promise and the recipient of this research should keep this in mind.

INTRODUCTION TO PERSONAL RAPID TRANSIT (PRT)

The best introduction to PRT is through watching videos and animations

Click the images to link to the videos

Operational PRT Systems: Heathrow & Masdar UAE

ULTRA

2GETTHERE

Suspended PRT Systems

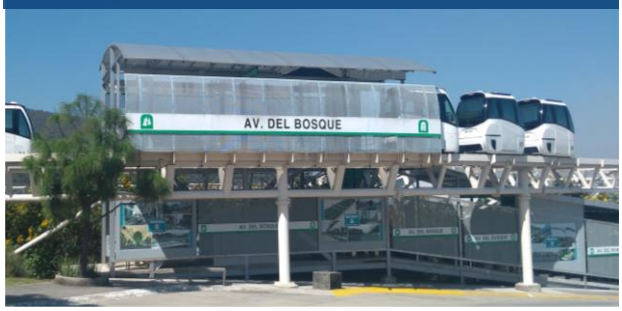
FUTRAN

TRANSIT X

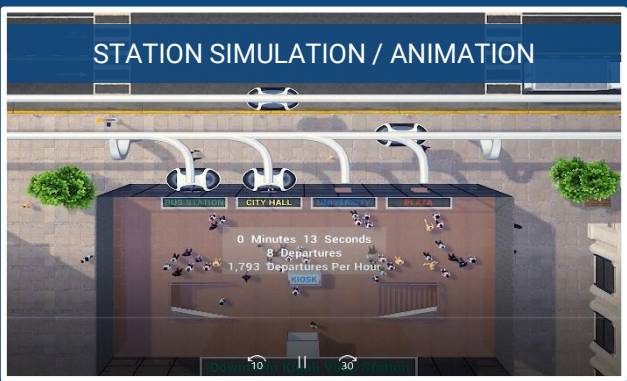
VUBA

PRT Offline Stations

MODUTRAM



STATION SIMULATION / ANIMATION



OPERATIONAL PRT SYSTEMS

MORGANTOWN 1975

MASDAR CITY ABU DHABI 2010

HEATHROW UNITED KINGDOM 2011

SUNCHEON BAY SOUTH KOREA 2014

Personal Rapid Transit (PRT) is a transport mode that originated in the 1970s featuring small, automated vehicles operating on dedicated guideways. PRT is also known as Automated Transit Networks (ATN) or simply as podcar networks. We use PRT vehicles and pods interchangeably in this research.

There are several PRT-like systems operating worldwide. At Heathrow in the UK and Masdar in the UAE the PRT vehicles travel on dedicated narrow roads and bridges like small cars. At Incheon in South Korea and Morgantown in the USA the vehicles travel on elevated or at grade tracks.

PRT falls into the broad on-demand transportation category of shared autonomous electric vehicles (SAEV). However, it has unique defining characteristics:

P: Personal because PRT utilizes small vehicles or pods with the capacity for 1 to 8 passengers. Families and small groups can travel together in these autonomous vehicles.

R: Rapid because the time taken for a PRT trip can be shorter than other urban transport modes. Several attributes make PRT Rapid:

First, the pods can travel at speed (currently up to 70km/h) on dedicated guideway structures (grade-separated). The self-driving vehicles are safely routed by a central control system, with a controlled short headway between vehicles.

Second, the small vehicles are summoned on-demand with little waiting time and can load and unload passengers quickly.

Third, on-demand transport doesn't have fixed routes and schedules: the passengers specify their destination and can be routed there directly without stopping or slowing down. Pods bypass offline stations where they are not required to stop.

T: Transit because the vehicles can carry passengers and goods across a city (or a region) from any point to any point like a taxi, 24 hours a day and 7 days of the week, moving passenger volumes of 7,000+ per hour historically and forecast to increase this to 20,000+ with current technologies.

PRT transportation is often confused with the automated people movers (APM) found in many airports (e.g. in the United States: Newark, Atlanta and Las Vegas). APMs operate as automated shuttles on fixed routes, as compared to PRT which operate more as automated taxis.

The PRT industry (Figure 6) consists of a group of established PRT provider firms like Ultra PRT and 2getthere that operate across the industry value chain, performing research and development, developing and deploying PRT systems for customers like corporations and cities, and operating those systems on behalf of these customers in several cases.

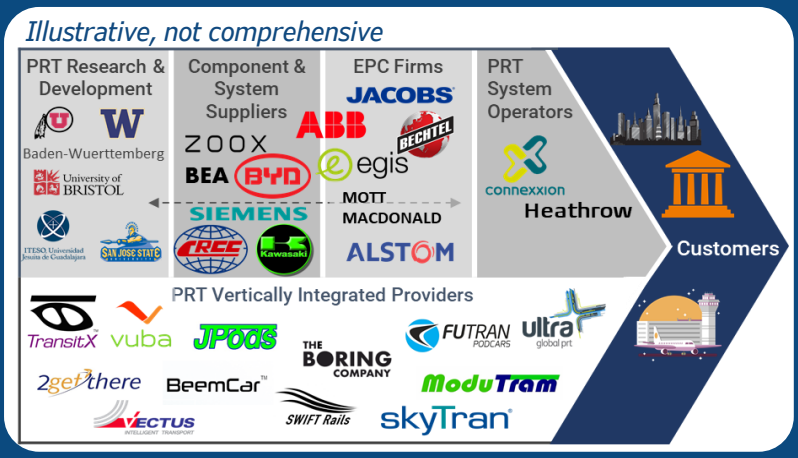
There are also several early-stage PRT firms like SkyTran, ModuTram, The Boring Company and Futran that are established and have full-sized test tracks (or a test tunnel in Boring Company's case) but have not yet deployed a commercial PRT network.

In addition, there are startups like Transit X, Supraways, BeemCar, JPods, Swift Rail and Vuba that are at various stages of the R&D process.

The set of dedicated vertically integrated terrestrial PRT providers of infrastructure and technologies are the focus of this research.

Figure 6) The Major PRT Value Chain / Ecosystem Participants

The PRT industry ecosystem consists of dedicated vertically integrated PRT provider firms, several other large industry segments and city, corporate and state customers. Of the numerous suppliers of autonomous vehicle technologies, electric motors, vehicles, structural materials and engineering services, two segments worth noting are the rail systems companies and EPC firms.



Rail systems providers like Alstom and BYD can partner with PRT firms to provide custom-made mobility technologies, vehicles and track structures.

Engineering, procurement & construction firms (EPC) are natural partners for PRT providers in developing and building PRT systems. These tracks are large and complex engineering projects that require world class logistics and program management capabilities.

There are many potential entrants into PRT that are discussed in this research, including the automotive majors, energy companies and technology firms.

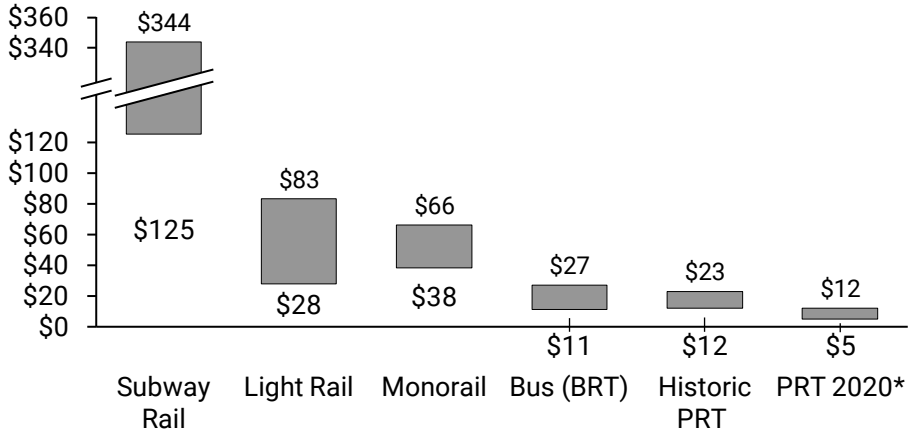
Section	Why is there a ~$45 Bn Investor Gain Opportunity?
1	Because PRT's cost advantage and recent technology advances make it an attractive infrastructure investment

Elevated PRT systems appear futuristic with their aerodynamic self-driving pods gliding quietly overhead. However, all the technologies required to develop and operate the systems already exist, and in the cases of Vectus, Ultra, ModuTram and 2getthere, have been in operation on PRT tracks for years.

PRT has historically provided a low capital cost and low operating cost in comparison with the major urban transit options.

Figure 7) Transit System Capital Cost Per Km

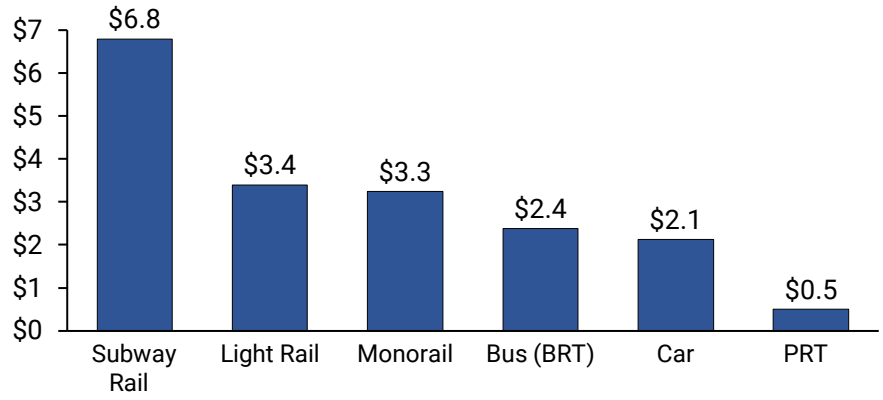
Outliers excluded



Terrestrial PRT has low capital costs because small vehicles require less structural support and the track can be elevated, using existing rights of way (ROW). Historic capital costs are between $12m and $23m per kilometer, which is on average less than of half rail-based mode capital costs and ~18% less than BRT (Bus Rapid Transit).

Figure 8) Transit Operating Cost

Per 10 km passenger trip



PRT has low operating costs because the vehicles are automated, requiring no drivers. The pods only operate when they are needed, using ride-sharing for most trips. Further, the small vehicles and electric motors require little maintenance.

Renewed interest and investment in PRT has partly been driven by improved system business economics. This is a result of the advancement of, and efficiencies in, several technologies that are being widely deployed in on-demand transportation over the past decade. These have led to innovations such as ride-hailing services, e-bikes and electric scooters.

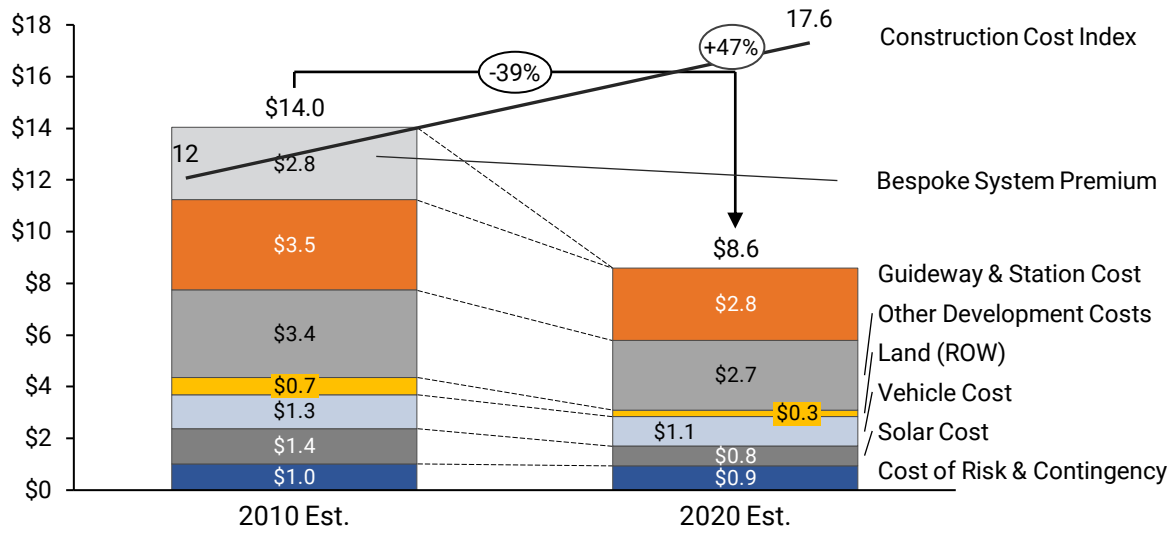
We describe some of the key PRT technologies following, and how technology advances are reducing costs, boosting passenger volume capacity, and – in the case of solar arrays – enabling a new offering model.

**Excludes the Boring Company's subterranean tunnel solution*

PRT Capital costs have declined by approximately 40% since 2010. This contrasts with the cost of construction materials that has increased by ~47% over the same period.

Figure 9) PRT Capital Cost Estimate Per km 2010 to 2020*

Illustrative



Estimate based on historic PRT costs, recent PRT proposals and commodity prices

Figure 9 provides an estimation of PRT cost migration over the past decade. The extent of the overall cost reduction depends on the specific PRT system's use case, length, configuration and guideway and vehicle choices. However, there are several advances that broadly contribute to the efficiencies of Figure 9 that impact across the various cost categories:

LIGHT VEHICLE & GUIDEWAY STRUCTURES

PRT is characterized by small lightweight vehicles made from composite materials like GFRP operating on or suspended from guideway structures. Stronger and lighter structural materials used in both vehicles and guideways (like BeemCar, Transit X and Vuba Corp's planned carbon composite and GFRP guideways) reflect materials science advances and new manufacturing technologies like 3D printing and robotics.

'FOLLOW THE ROAD' RIGHT OF WAY

PRT System providers in the US, India, Europe Africa and China have in recent years begun proposing that the PRT guideway network route follows existing roads, and the guideway uses that road's right-of-way with the authorization of the applicable city.

Guideway structure columns can be placed next to the road or on the road median supporting an elevated vehicle network (typically 4 to 5 meters in height) above the road itself or the sidewalk area. Or, in the case of 2getthere, have vehicles use the road like cars in combination with the separate PRT grade. This land-lite model is enabled by the aforementioned light guideway structure and vehicles and reduces or eliminates two capital costs.

First, fewer land purchases, if any, are required for the route and for the small PRT stations.

Second, fewer, if any, bridges are required to be constructed or tunnels dug. The guideway simply follows the road and benefits from the transportation infrastructure already in place. Wheeled PRT vehicles are designed to comfortably operate on road gradients, and suspended PRT systems can operate on gradients steeper than roads.

**Excludes the Boring Company's subterranean tunnel solution*

Guideway Structures Designed for Road-Based Right of Way


VUBA


MODUTRAM


ULTRA


SUPRAWAYS


METRINO

ROAD-BASED ROW ENABLES PROCESS EFFICIENCIES

The 'Follow the road' ROW enables PRT process efficiencies in that a guideway with predictable column spacing (20 to 30 meters), modest turns and gradients requires a limited amount of customization. Hence there are a comparatively small and predictable number of manufacturing variations and SKU's to produce.

This enables automated mass production and overcomes a significant hurdle of the historic capital costs of PRT – the need for costly customized steel fabrication and unique composite structures. Further, predictable parts means a modular approach can be taken to freight/transport and track assembly, saving both time and labor in these processes.

Futran, a South African-Chinese PRT firm has a manufacturing facility in operation in China and plans a mega-factory in Jiujiang to develop significant scale economies and produce modular guideways. This is based on their steel guideway innovation: the CrossBeam. Similarly, Ultra has set up a manufacturing facility in India.

With the modular approach, Futran expects to be able to erect 50 to 100 meters of guideway overnight using a single crew once the concrete foundations for the pillar have set in advance. Other firms like Transit X expect to deploy as much as 200 meters of guideway overnight.

TERRESTRIAL PRT AS A SOLAR POWER PROVIDER

Suspended vehicle PRT networks can utilize solar panels on top of guideways and stations. PRT providers expect to be able to generate a megawatt per mile of track, ceteris paribus.

The first aim of installing solar arrays is to provide power for electric PRT vehicles.

However, several efficiencies combine to provide a potential energy business that increases the overall financial return of the system:

- The cost of solar energy has declined significantly over the past decade, with solar panels ~63% less costly per KW since 2010, and lithium-ion batteries for storage ~88% less costly over the same period
- Improved storage technologies with less energy loss
- There is no need for land on which to locate the solar array

Solar generation capabilities are specific to the track location photovoltaic potential, guideway length and design. The ability to generate and store an energy surplus will vary track to track, with a likely scenario being PRT providing energy to the host city's energy grid during the day and drawing power from that grid at night. PRT's solar potential greatly increases the attractiveness of a system to the host city and is already a key PRT marketing attribute.

EFFICIENT AND LOW-COST ELECTRIC MOTORS

PRT Vehicle engines are typically powered by small electric motors. Several providers like Futran, SkyTran and Vectus utilize tracks with bogies, whereas Ultra and 2getthere utilize rubber wheels like an electric car on top of an open guideway. Advances in such electric motors like in-wheel motors are providing increased torque in smaller packages and, in combination with batteries and powertronics, longer vehicle range.

A related example of efficiency in vehicle design is France-based Supraways, who are designing their suspended vehicles to use standard automotive parts.

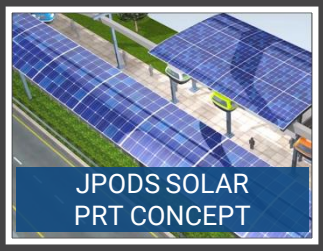
PRT SYSTEMS ARE THE FIRST TO FULLY UTILIZE SELF-DRIVING TECHNOLOGIES

The first generation of in-service PRT networks already have autonomous control software that has completed over 300 million injury-free passenger kilometers. This is partly due to a unique feature of PRT: a central control system routing the fleet integrating with the vehicle's own self-driving software and hardware.

The central control system maintains a fixed envelope of space around each vehicle that no other vehicle can enter and routes the fleet using synchronous or asynchronous control. By comparison, self-driving cars will rely on their own technologies like sensors to navigate safely and respond to other vehicles and obstacles without the benefit of central control or fleet routing.

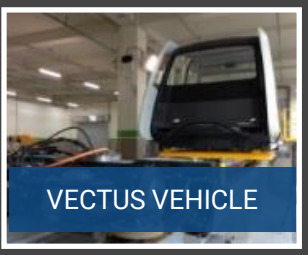
The first generation of PRT's automation has already achieved the Society of Automotive Engineers *Level 5 Automation* classification: full automation technology that requires no involvement of humans. This classification excludes The Boring Company's solution which will use Tesla cars in their subterranean tunnels using their *Autopilot* mode.

The second and third generation of autonomous vehicle software currently under development will enable faster speeds (SkyTran is targeting 120-150 km/h) and sub 2 second headways. These will provide a rapid and continuous flow of vehicles, with passenger volumes of 20,000+ per hour per direction, the equivalent capacity of 6 urban road lanes.



JPODS SOLAR PRT CONCEPT

FUTRAN'S CROSSBEAM



VECTUS VEHICLE

ULTRA CONTROL SYSTEM

We note these efficiencies apply to installing and operating new PRT systems with the current and emerging guideway, control and vehicle technologies. Retrofitting a PRT system in place of an existing light rail or subway train system is feasible technically, and likely financially attractive. However, the legacy transit operations and their associated costs present a challenge. Politicians and unions can be expected to oppose job losses both in the operations and at the headquarters, and the organization may have obligations, contractual and otherwise, that cannot easily be reneged on.

Looking forwards, these technology advancements will continue, improving every element of the development, deployment, and operations of PRT networks. PRT systems will have ever greater scale, with higher volumes of passengers and an improving offering model to buyers. Over time, trips will be less expensive, faster, more convenient and will remain completely safe.

The three PRT-like systems that have been installed since 2010 and are in operation are small systems, much like line shuttles, serving an airport (Ultra at Heathrow), an institute (2getthere at Masdar) and, the longest system at 5 km, a tourist attraction (Vectus at Suncheon Bay).

These systems, as one of the developer firm CEOs freely admits, are custom made solutions that don't showcase the any-point-to-any-point taxi-like capability of PRT and the potential of PRT to shorten urban trip times. They're cost and convenience-based PRT use cases.

PRT NETWORK ECONOMICS CAN MAKE LARGE SYSTEMS HIGHLY PROFITABLE

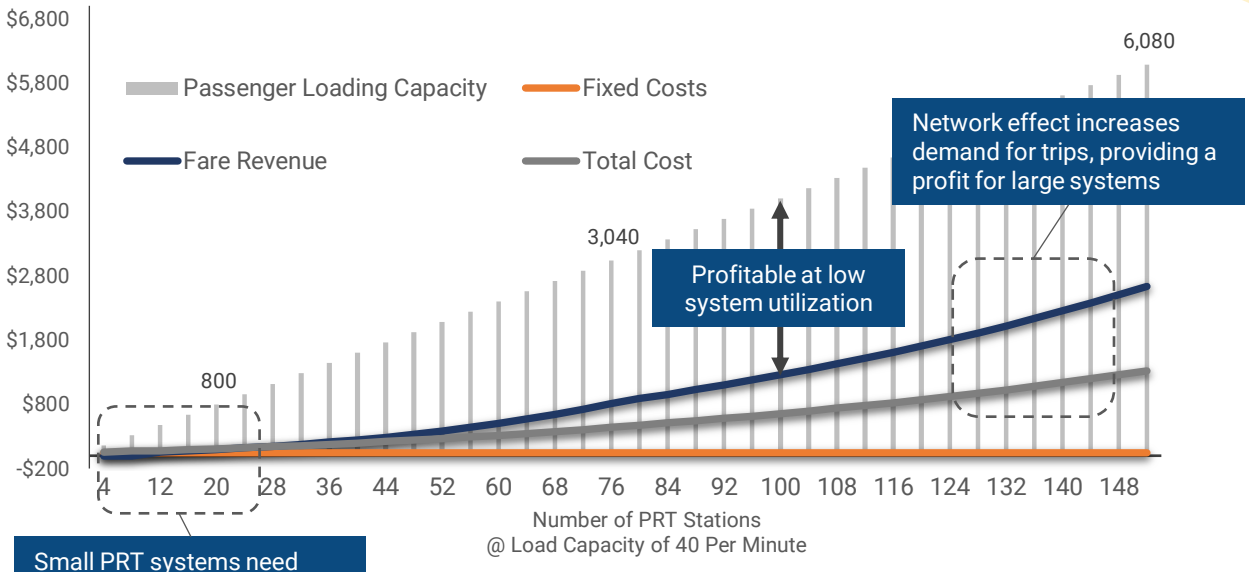
Figure 10 illustrates the expected PRT transportation network economics that provider firms have been simulating and proposing in the past few years based on current system technologies. The data and assumptions are from Praetor Capital's proposals for several terrestrial PRT provider clients on three continents, from other providers' proposals and independent research.

Small PRT systems of less than ~20 stations are generally unprofitable, able to recoup operating costs but not their capital costs while maintaining low fares. There are exceptions where high volumes can produce sufficient revenue such as the planned Indian route of 3.3 km that was expected to produce a 12-18% IRR on a fare of under a dollar. The exception proves the rule in this example as the track was cancelled when the provider was denied fare flexibility.

A few elements combine to make PRT transportation networks potentially profitable at system sizes of ~20+ stations and highly profitable beyond 100 stations. In the Figure 10 illustration the average fare is $0.50 for a 5km trip.

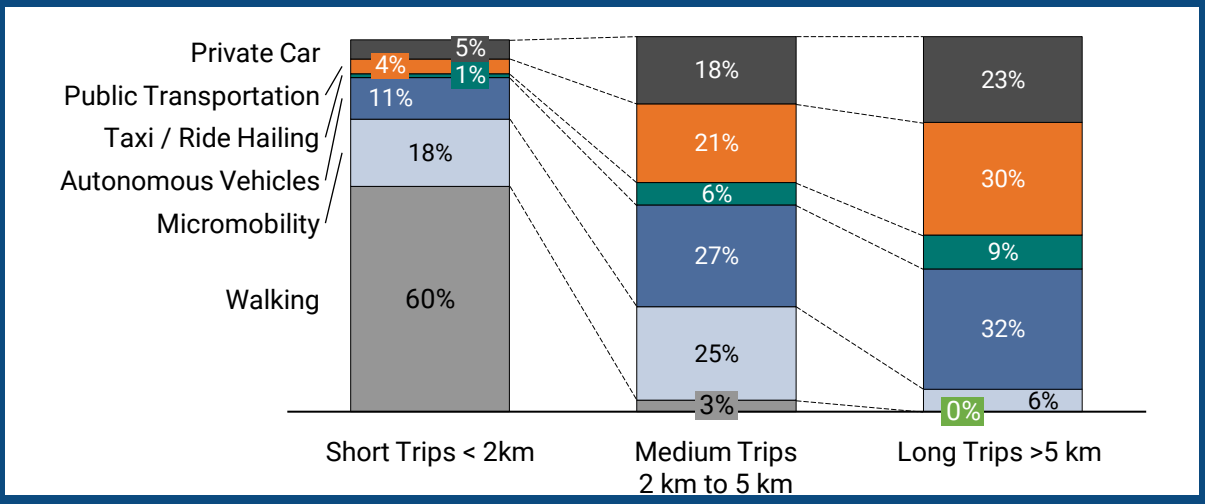
Figure 10) PRT Transportation Network Economics*
Per Minute

Illustrative



*Excludes the Boring Company's subterranean tunnel solution

Figure 11) Urban Mobility Option Preferences



First, PRT demand is expected to be robust for long urban trips.
In a three-year collaboration, BCG and the World Economic Forum have done extensive research and conjoint-analysis based modelling on the likely future urban use of autonomous vehicles.

The BCG model represented in Figure 11) Illustrates that autonomous vehicles (AVs) are more likely to be selected for trips of over 2 km. For shorter urban trips, walking and micromobility options like scooters and e-bikes comprise a 78% preference. AVs are preferred by 27- 32% for longer trips.

Since PRT networks expect to take market share from existing public transportation options and a portion from cars, future PRT demand should be robust. Recent proposals for city-wide PRT systems, and the related feasibility estimates broadly forecast attaining 30% to 40% of existing passenger traffic. We examine AV demand further in Section 2

A second demand element that supports larger PRT systems is the network effect. Adding stations provides an exponential effect on number of destinations and hence passenger demand. If there are two stations, there are only two potential trips in the network. If we add a third station, there are six potential trips.

Third, on the supply side: there are sufficient stations to provide the required volumes of passengers at a loading rate of 35 to 45 per minute (2+ station berths).

Fourth, operating scale. There is sufficient operating profit to cover system operating and capital costs.

The simplified view of PRT transportation network economics in Figure 10 warrants further explanation. Large PRT systems are not by definition highly profitable, there are other factors to consider.

System size provides high passenger volumes as a primary driver of PRT revenue and, by extension, profitability. The other driver of revenue across industries is price. In the case of PRT, ticket price or fare.

In Figure 10 we used $0.50 to demonstrate that the system can be profitable at comparatively low fares. We've included Figure 12 for context: Urban public transit costs by city.

Figure 12) Urban Public Transit Costs For a 5 Km Trip Per City
2018 Data

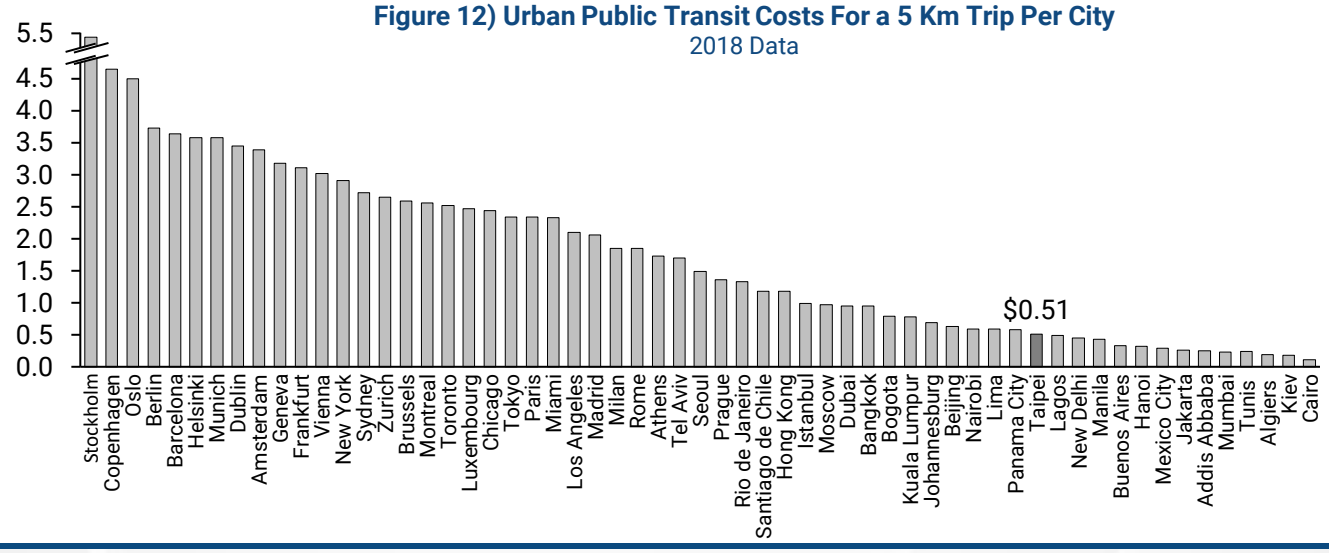


Figure 13 provides indicative financial returns (Return on Invested Capital) for PRT systems at different fare levels.

Illustrative

Figure 13) Illustrates PRT project returns for different numbers of stations and average ticket prices for a 5 km trip.
We've used a capital cost of $8,6m per km in the return calculation. The chart emphasizes the point made in Figure 10: system size drives return.

However, higher fares can provide a profit in smaller systems and vice versa.

Average fare masks the potential option for PRT providers to charge different fares for different service levels.

Premium fares charged for a private pod and direct-to-destination trips can subsidize base fares for shared rides with stops en-route. In this manner systems may be able to profitably serve low-income markets.

Figure 13) PRT Transportation Network ROIC Under Different Fares and Station #s

# Stations	$0.35	$0.50	$0.65	$0.80	$0.95	$1.10
12	-12%	-6%	-2%	3%	8%	13%
20	-7%	-2%	3%	7%	13%	18%
28	-5%	1%	5%	10%	16%	21%
36	-3%	2%	7%	12%	18%	24%
44	-2%	4%	9%	14%	20%	26%
52	-1%	5%	11%	16%	23%	29%
60	1%	8%	13%	19%	26%	32%
68	3%	10%	16%	21%	29%	35%
76	5%	12%	18%	24%	32%	39%
84	6%	13%	21%	29%	36%	43%
92	6%	14%	22%	31%	38%	46%
100	7%	15%	23%	32%	40%	48%
108	7%	16%	24%	34%	42%	51%
116	8%	17%	26%	36%	44%	53%

Fare Per 5 km Trip

An examination of returns isn't meaningful until we consider the level of risk. These assertions on the performance of large PRT systems are unproven in practice, even as the industry is confident in its predictions. The existing C21 PRT systems operational and cost performances provide some comfort in this regard, but engineering at scale is an altogether different proposition. We discuss risk and its mitigation in Section 7.

Section	Why is there a ~$45 Bn Investor Gain Opportunity?
2	Because PRT has several other competitive advantages vs. urban transit modes like cars, BRT, light rail and subways

In addition to the cost advantage, PRT has other advantages over competitor urban transit modes.

MACRO-LEVEL: PRT HAS MULTIPLE COMPETITIVE ADVANTAGES OVER OTHER TRANSIT MODES
We examine the competitiveness of PRT verses current transit competition in Figure 14. The Harvey-ball icon's green fill in Figure 14 scores the transit modes in each attribute category.

As Figure 14 indicates, the characteristics of urban PRT systems are not matched in combination by any other modern transit mode. PRT provides the shortest urban trip time, closely-spaced stations, passenger volumes that are comparable to 6+ road lanes, it's green transportation and frees up surface urban land for alternative uses. Hence PRT has multiple competitive advantages over other transit modes.

Figure 14) Urban Transit Mode Comparison

	PRT 2020*	CAR (URBAN 4 LANE ROADS)	BUS (BUS RAPID TRANSIT)	LIGHT RAIL	SUBWAY RAIL	NOTES ON PRT VS. COMPETITORS
Typical Stations Per km	1 to 1.5	Point to point + parking	1 to 1.5	0.5 to 1	0.5 to 1	PRT Stations have a loading capacity of ~3000 per hour.
Ridership Per Direction Per Hour	20,000	1600-2600	<5,000	<30,000	<50,000	Several PRT firms expect to have a higher capacity than 20k. Praetor expects this level will not be exceeded before 2025 (G3 Control systems)
Average Urban Route Speed	40-70 km/h	30-65 km/h	15-30 km/h	30-50 km/h	40-60 km/h	Conventional PRT expects to attain 100 km/h urban speeds, with SkyTran's mag-lev expected to attain 150 km/h
Green / Sustainable	High	Low	Medium	Medium	Low	See Section #3 • PRT can be zero emission (solar-power) • A city-wide PRT system of 100 km can remove ~8 million tonnes of CO2 from the atmosphere (reduce traffic by ~20%), the equivalent to a forest of 46 km^2
Footprint on Land	Very Small	Medium	Medium	Large	Very Small	PRT uses 1/100th of the land space that BRT does, freeing up urban space for other uses.

MICRO CUSTOMER-LEVEL PROVIDES OPTIMISM PRT WILL BE WIDELY USED
Competition can be evaluated at the macro level, but purchasing transactions take place at the micro customer level.

There is a legitimate question of whether people will use autonomous vehicles, and PRT specifically, to travel in urban areas? There are several reasons why PRT's prospects are promising in this regard.

**Excludes the Boring Company's subterranean tunnel solution*

First, there is a generational shift underway on car ownership

Car ownership remains a status symbol worldwide. However, there are indications millennials and Gen Y are open to different models of car ownership, enabling a partial consumer shift to shared autonomous vehicles. The past decade has seen, for example, the percentage of Americans with a drivers' license decline across all age groups, but this trend is strongest in those under the age of 24 (approximately -6 to -12%).

Second, Micromobility and MaaS is rising

Micromobility is being driven by the rise of the sharing economy. Mobility on-demand enables people to use smartphone applications to request AVs. Many young city dwellers are purchasing access to e-scooters, e-bikes and shared AVs as an alternative to car ownership. These solutions, research indicates, are most likely to provide first-mile and last-mile trips, taking people from their homes to public transportation networks and back home again. Such trips combined with Mobility as a Service (MaaS) applications will accustom inhabitants to taking multi-modal journeys rather than single-mode car trips.

Third, The signs are positive for the potential use of Autonomous Trains (PRT-like AVs).

The numerous customer surveys that have been undertaken on autonomous vehicles provide differing results on potential adoption. However, the broadly reported cautious optimism on the future use of AVs is well represented by the data sets of Figure 15 and Figure 16. Of note here is the comparative customer comfort with autonomous trains as compared to AV cars. This is likely owing to the relative perceived safety (and lack of complexity) of travelling on a rail and a potentially separate grade compared to interacting with pedestrians, traffic signs and other vehicles.

Figure 15) Those 'Likely' or 'Very Likely' to Ride in an AV

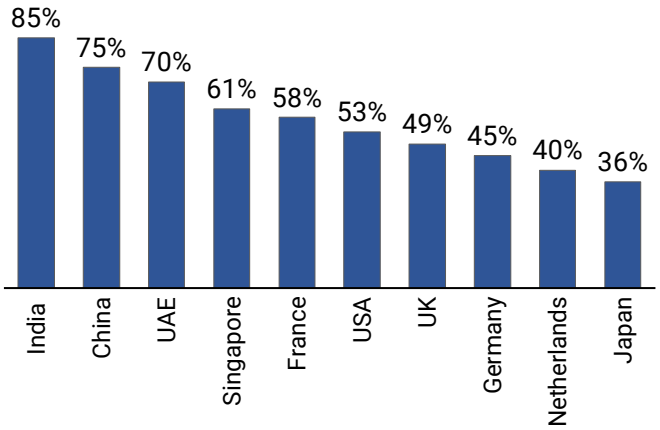
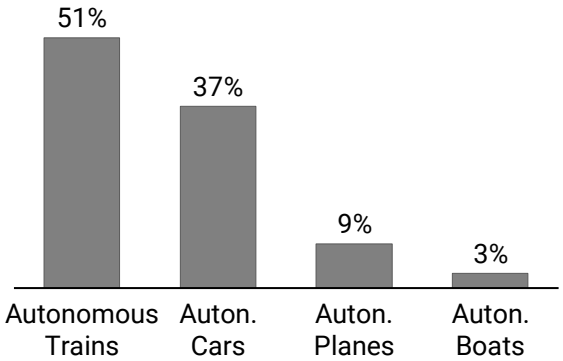


Figure 16) Which of The Following Will You Be Most Comfortable In?



Further, we return to the BCG Boston AV analysis introduced in Section 1.

The study results predicted a shift to mobility on-demand (all kinds of AVs) accounting for 30% of trips in Greater Boston and 40% of all trips within city limits. The primary drivers of this forecast future shift were the cost advantage of AVs, the added convenience and comfort compared with mass transit, and the avoidance of the trouble and cost of city parking.

MICRO-LEVEL: TRANSIT SYSTEM BUYER NORMS ARE A MODEST NEAR-TERM OBSTACLE

PRT system buyers – or buyer influencers - will be public transportation planning professionals. These professionals operate in the structured environment that worked well for C20 transit purchase decisions. However, PRT represents a paradigm shift for them, and isn't well suited to their linear procurement process and historic manner of contracting.

This presents a modest competitive obstacle for PRT compared to traditional modes like BRT, but one that can be overcome, and is already being overcome, with resources (time, suitable regulations and capital) in markets like India and China.

We examine this issue further in Section 5 on potential PRT barriers to adoption

MICRO-LEVEL: THE WORLD BANK WILL PROVIDE FUNDING ONCE ONE LARGE PRT PROJECT SUCCEEDS

Competitiveness in the developing-world can at times depend on partnering with multilateral institutions during the early phases of a potential project. One such institution is the World Bank (IBRD), which can only – by its internal regulations – sponsor feasibility studies and support projects that fall into proven transit categories like BRT, subways and light-rail. IBRD funds such studies across the developing-world.

Once PRT has proven itself through one large project success it will likely become a World Bank-approved category for early-stage funding and project support. Further, PRT will become part of the *terms of reference* of studies into the best transit solutions, participating in side-by-side comparisons. This can become a crucial enabler for PRT's success in these markets.

SEVERAL COMPETITIVE ADVANTAGES WILL ENABLE PRT TO PREVAIL

From a competitive strategy perspective, a significant capital and operating cost advantage (low-cost provider) should be sufficient for the transportation mode to compete effectively. This should power through any potential purchaser resistance – all it takes is political will.

Multiple competitive advantages is extremely rare in the author's experience as a 20-yr practicing strategist. PRT looks like firms did during the heady days of the internet boom from 1997 onwards: unbeatable in theory once they get to scale.

Further, several of PRT's competitive advantages are sustainable and extendable. As closed systems, PRT networks will optimize their functioning over time, providing high volumes of fast-moving pods, improving service levels and maintaining low costs. Light rail, busses and cars are limited in what they can achieve and optimize with their shared grade: the road.

Such a unique competitive position can only result in a disruption to C21 urban transit, but this potential has been rarely noted. Once such example is when the author led a study for a leading New-York based strategy consultancy in 2009 that predicted PRT would have a significant share of urban transit by 2025. That prediction looks partly correct: it's taking longer than expected.

Barriers to adoption are discussed in Section 5. Once those begin to be pushed aside after one large PRT system demonstrates its capabilities, PRT's competitiveness will begin to prevail.

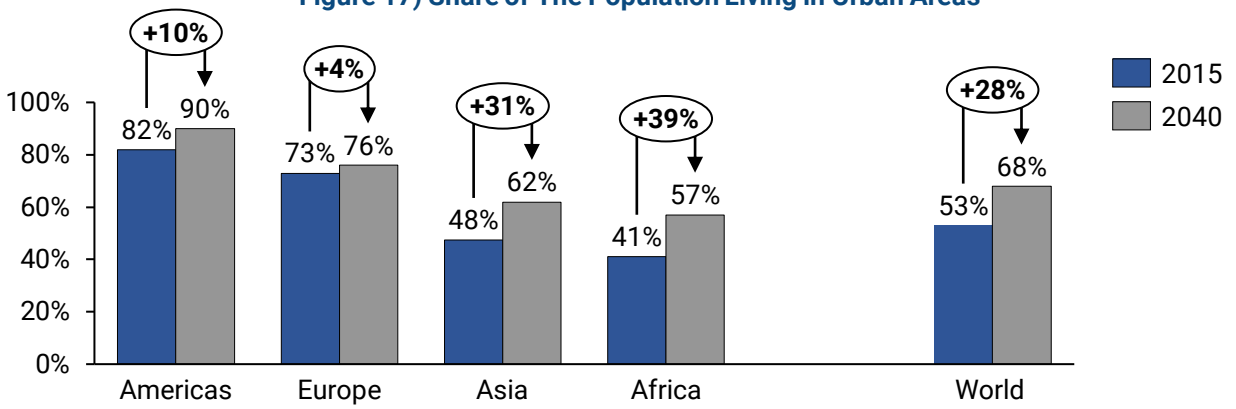
Note: The MACP Chart introduced in the Executive Summary is in the Appendix

Section	Why is there a ~$45 Bn Investor Gain Opportunity?
3	Because PRT is a solution to the global urban transportation crisis, resulting in a market opportunity of over USD 1.5 trillion p.a.

The World Bank estimates that 55% of the world's population – 4.2 billion inhabitants – live in cities currently. By 2050, the urban population is expected to double in size, resulting in 7 of 10 people in the world living in urban areas.

The expected urban population percentages from 2015 to 2040 by region are illustrated in Figure 17.

Figure 17) Share of The Population Living in Urban Areas



The speed and extent of urbanization provides challenges, including meeting the accelerated demand for affordable housing, basic services and jobs. There is an urgent need for well-connected and affordable transport systems. An estimated $45 trillion of road and rail transportation investments are required by 2040.

For city planners, the most desirable transportation solutions will be those that can help shape urban mobility ecosystems and solve C21 problems. PRT addresses four major concerns of buyers like cities and corporations:

FIRST, THE PROFITABLE PRT SYSTEMS CAN BE FINANCED WITH PRIVATE CAPITAL

Low ridership and the need for affordable fares makes most urban transit services financially unsustainable. Despite significant subsidies and cross-financing (e.g. tolls), almost all the public transit systems across the world (two systems in Japan are the exception) cannot generate sufficient fare income to cover their operating and capital costs. In the United States alone, public transit systems lose on average ~$1.75 per passenger trip. The result is that public funding or public financial backing is required for new transit system investments.

PRT's business economics were illustrated previously in Section 1. PRT Systems on-demand nature makes cost recovery possible, and potentially capital cost recovery too. Driverless pods travel with customers on an as-needed basis, eliminating unprofitable time-of-day service and reducing the impact of poorly utilized routes.

Small PRT system financial performances will vary, but capital cost subsidization is likely required. Midsized to large PRT systems are expected to generate an internal rate of return (IRR) of between 12 and 40%, likely above the individual states *cost of capital* requirements, and well above the *cost of debt*, the more applicable financial hurdle rate for infrastructure projects.

The ability to privately finance transit systems and not have to subsidize ongoing operating losses can be transformative for city budgets and this creates a significant market opportunity for PRT. No longer will many cities have to compete for, and wait for, public transit funding.

SECOND, PRT PROVIDES GREEN URBAN TRANSPORTATION

Emissions from the transport sector are a major contributor to climate change: an estimated 14% of annual emissions (including non-CO2 gases) and approximately a quarter of CO2 emissions. Within this category, city-based vehicles account for 40% of all CO2 emissions from road transportation.

Installing solar-energy based PRT in a city can provide it with significant progress towards attaining its climate goals. The climate benefit is unlocked through the estimated 20% reduction in urban traffic that a city-wide PRT system would provide. This eliminates approximately 8 million tonnes of CO2 from the atmosphere, which is the equivalent of planting a 46 km^2 forest.

This sequestration impact can be larger if the city restricts motor vehicle access to congested areas through traffic demand management in favor of PRT access. This opens the possibility of pedestrian-friendly and green urban cores where land previously used by roads is repurposed.

THIRD, PRT WILL SIGNIFICANTLY REDUCE CONGESTION

The Danish urban designer Jan Gehl put it best: "If you make more roads, you will have more traffic." Traffic congestion has worsened over the past decade, with developing-world cities like Mumbai, Manila and Istanbul over 50% congested in 2020. Traffic congestion is a poor use of urban dwellers' time and extracts a toll of an estimated 2 to 5% of GDP by measures such as lost working time, the increased cost of doing business and wasted fuel.

As indicated previously: PRT can reduce congestion by effectively installing a 6-lane road capacity guiderail in the air above, and next to, current roads.

FOURTH, PRT IS POSITIVE FOR URBAN HEALTH AND SAFETY

The PRT systems in operation around the world have perfect safety records. PRT passengers will be drawn from other transportation modes that have poor safety records, reducing the estimated 1,35 million worldwide traffic accident fatality count.

Air pollution is also a contributor to poor health, and combustion engine transportation emits CO2, PM 2.5, PM 10, NOX and unburnt hydrocarbons. Solar-powered PRT has zero emissions and tracks without solar power use electric vehicles.

PRT has additional positive attributes for cities that are lower priority concerns such as PRT's minimal impact on hydrology and its proven functioning during force majeure events such as severe weather.

All-of these attractive attributes combine with PRT's financials to provide system business cases for cities that provide high NPVs (i.e. attractive as investments). This result improves further where PRT eliminates or reduces the need for investment in roads or other transit modes like BRT.

LARGE SYSTEMS ARE THE MOST ATTRACTIVE PRT USE CASE

There are different use cases for PRT systems for corporate, city and state customers. Small systems provide attractive options, however PRT's unique advantages and capabilities are best applied to large any-point-to-any-point systems. These large systems are where we expect the industry to focus once the profit and returns potential is proven.

The use cases illustrated below in combination with PRT's cost advantages provide PRT with an enormous global market opportunity.

	SMALL SINGLE PURPOSE TRACKS WITH <20 STATIONS	MID-SIZED TRACKS FOR SMALL AREAS WITH 20 TO 50 STATIONS	LARGE CITY-WIDE SYSTEMS OF 50+ PLUS STATIONS
Images:	 T5 @ Heathrow (Ultra)	 Haridwar City	 Santo Domingo Transit X & Ajman City Ultra
Examples:	• Existing tracks: Heathrow, Masdar & Suncheon Bay • Planned: Gurgaon, Chengdu Tianfu Airport, Brussels Airport	• Bidding in India: Haridwar City and Delhi to Haryana • Contracted in Southern Africa (country confidential) • Contracted Jiujiang China	Contracted in China: Jilin Planned: • UAE: Ajman City and Dubai • Rwanda: Kigali • Dominican Rep: Santo Domingo
Use Cases:	• Single-use tracks for airports, resorts and educational institutions • Small PRT systems replace unprofitable bus or train routes or provide last-mile connections	• Connecting urban transport destinations like stations and airports to downtown areas • High volume urban corridors (trunk routes) with feeder tracks	• A track network covering full cities or city centers. any-point-to-any-point travel. Little need for first and last mile connections. • The tracks will typically have many small stations close to one another for convenient access
Financial Case:	Cost-based – no fare. PRT can be less expensive than the alternatives to build and operate (APMs typically cost $60-75m / km)	Operational break-even transit (developing-world) or slightly profitable (developed world)	For profit system, partly or fully privately financed
Passenger Value Proposition:	Faster and more private than a bus or shuttle	A much faster and more comfortable trip than using a bus or train, and for the same fare	The quickest, most reliable and most comfortable trip available in the city, and for an affordable fare
Expected USD Project IRR:	Not applicable. Cost based	Highly dependent on system specifics. Range of -10% (subsidized transit) to 20%	12% to 40% dependent on system specifics

PRT MARKET OPPORTUNITY SIZING

We use PRT Market opportunity sizing as an input into the investor value gap / opportunity calculation. This top-down perspective asks what a small share (e.g., 1%) of the market would provide in revenue. This doesn't represent the existing market for on-demand transportation, but its potential market.

The PRT market opportunity is two related sectors:

1. The global fares from related transit modes such as busses, light rail and taxis
2. The development of the PRT systems which is transportation infrastructure spending.

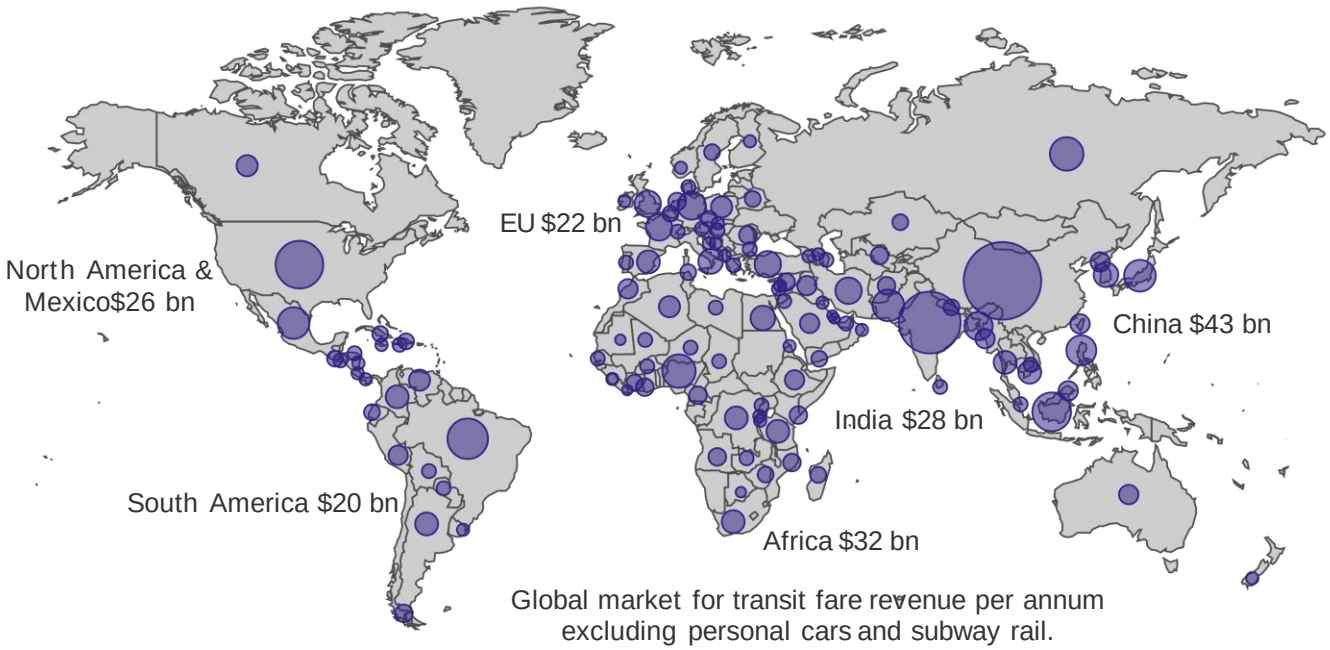
1) PRT TRANSPORTATION NETWORK FARES MARKET IS ~$170 BILLION PER ANNUM

PRT systems can take existing market share from several different transportation modes:

				
Market Size Est.	$40-60 bn	$100-115 bn	$10-15 bn	**= Global** ~$150-190 bn
# Large Urban Networks Est:	2700	2000	417	~5100

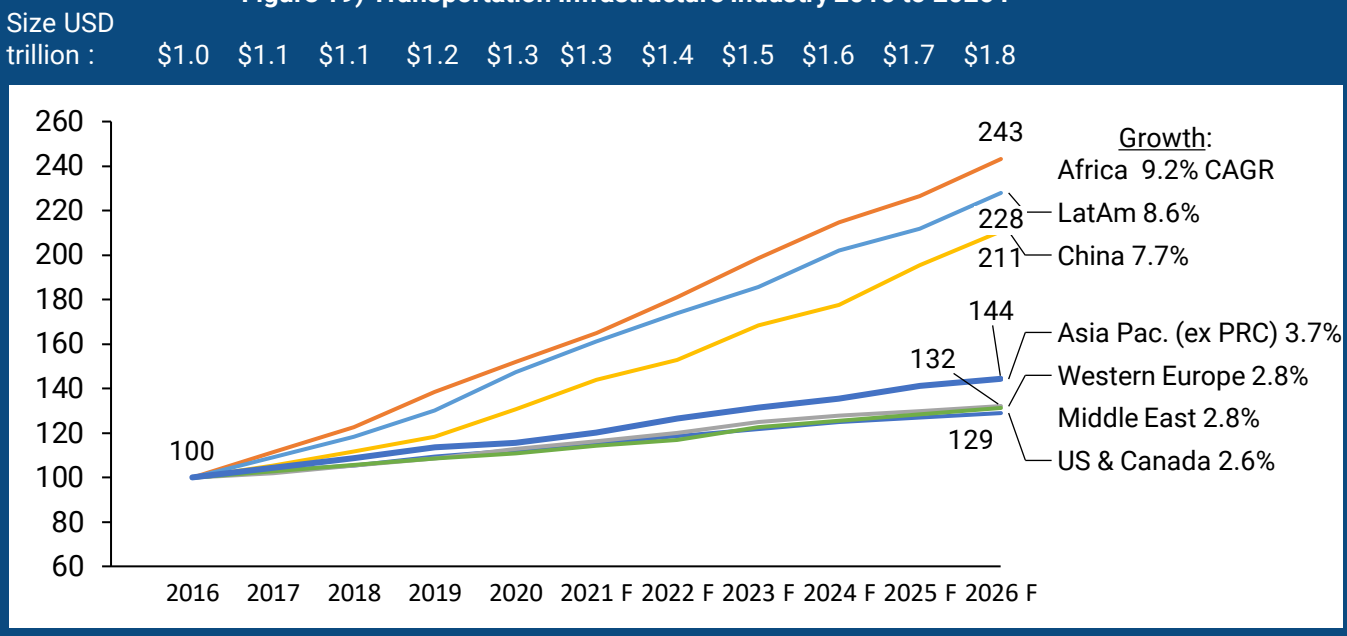
- There are 1000+ global cities of over 500k people, and ~900 urban areas with a density of over 3k per km^2
- Overall transit market growth of 7.5% per annum results in 200+ new system opportunities per annum
- This market sizing excludes personal automobiles, automobile gas, and heavy rail, which in combination exceeds a USD trillion dollars globally per annum

Figure 18) Global PRT System Fares Market By Country



2) PRT PROVIDER TRANSPORTATION INFRASTRUCTURE & TECHNOLOGY MARKET IS $1.3 TRILLION P.A.

Figure 19) Transportation Infrastructure Industry 2016 to 2026 F



SIZING CONCLUSIONS: AN EFFECTIVELY LIMITLESS PRT MARKET

Examining the $170 bn PRT transit fare market and $1300 bn transportation infrastructure market in combination provides the following findings:

- Demand is enormous and prevalent worldwide where there are large urban populations. PRT Companies have already delivered track proposals to over 200 countries, worldwide.
- Since the financing of large systems is expected to be from private sources, country GDP and spending power is not considered a primary driver of system affordability. Section 1 demonstrated PRT can be feasible at comparatively low fares
- The market demand is expected to be highest in the rapidly urbanizing developing-world markets like China, Africa, India and South America (in descending order of size). This is because it will be easier to install large PRT systems in cities that don't currently have competing transit modes like light rail or subways. This is a political constraint rather than economic – investing billions in unprofitable light-rail systems and then proposing to spend over a billion again years later to decommission the light rail and install PRT won't be popular
- Photovoltaic solar power potential is an important element of the PRT business model and this increases system demand in Africa, the Middle East, India, parts of Latin America, Mexico and the Southwestern United States
- PRT system component manufacturing is taking place in India (Ultra) and China (Futran), with plans for African facilities (Futran and Vuba). These regions are already leading in proposals and will likely have the first large tracks as the various countries purchase systems from their domestic or regional providers. PRT firms operating in China have learned they are expected to locate a manufacturing or assembly facility in a city that hosts a track.

We conclude the markets are so large and adding so much growth (in dollar terms) every year that they are effectively limitless for early-stage firms. There is room for 3-4 PRT competitors to thrive per region without crowding the market: hundreds of system opportunities p.a. is more than sufficient for 10-12 firms globally.

Section	Why is there a ~$45 Bn Investor Gain Opportunity?
4	Because there are attractive, and potentially highly profitable, entry points into the ~$45 bn value gap / opportunity

A portion of the value opportunity/gap analysis begins with the Advanced PRT Project Pipeline. The $82 billion.

WE PROVIDE AN 'EXPECTED TO CLOSE' PIPELINE OF $14 BILLION

For the purposes of determining the value gap, Praetor adjusts the Advanced PRT Pipeline lower by 82% to attain the 'Expected-to-Close' pipeline of $14 bn. We're providing an indication of what the industry could break ground on in the coming 3-5 years.

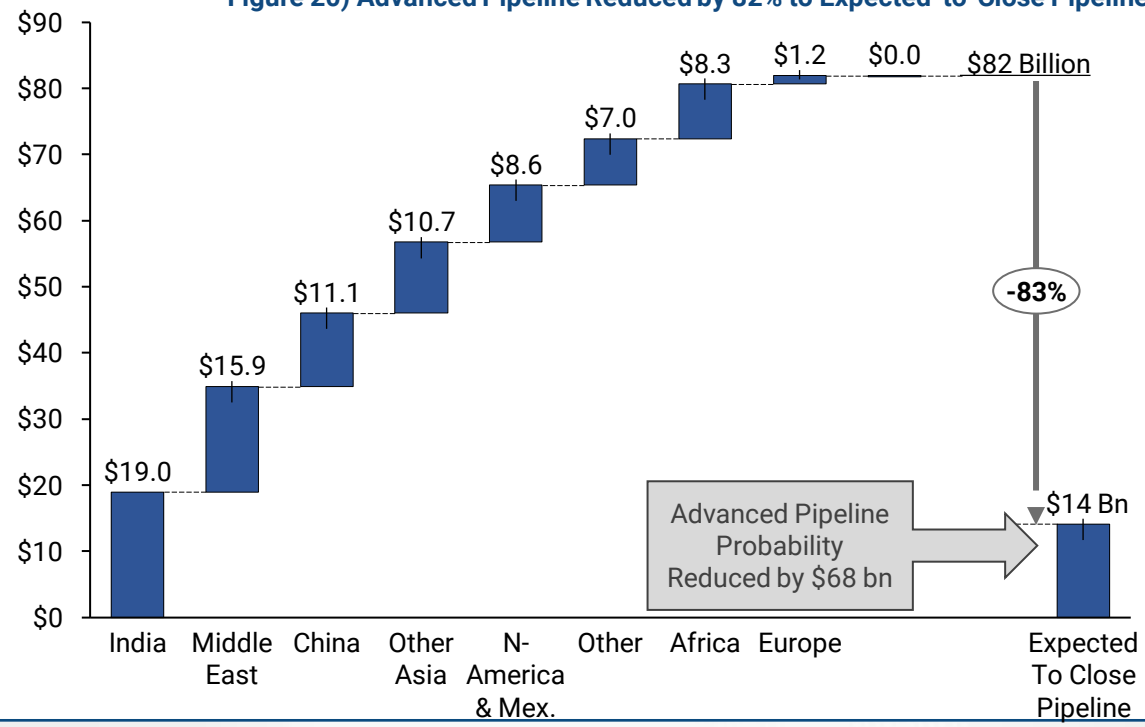
The probability adjustment is made on a project-by-project basis, although firm regional opportunities have been combined in a couple of cases. It's subjective, intentionally conservative and inaccurate by its estimate nature.

The 'Expected to Close' pipeline figures reflect:

- Companies that are well capitalized can execute more effectively than those seeking capital
- The project status. Is it: contracted; under MOU; bidding; pre-feasibility study etc.?
- The project location with risk in mind, most notably currency and interest rate impediments. For example, African and Caribbean opportunities are less likely to attain financing than those in the Middle East or China.
- The project size – a larger project means a lower probability of success

And, most significantly, the views of industry executives and Praetor Capital

Figure 20) Advanced Pipeline Reduced by 82% to Expected-to-Close Pipeline



The 'Expected to Close pipeline' is less than one fifth of the Advanced Pipeline. It is the set of projects that will be extrapolated for the purpose of determining PRT Providers' revenue, profitability, and subsequently, the value gap.

Figure 21) Expected-to-Close Pipeline By Geography
USD Millions

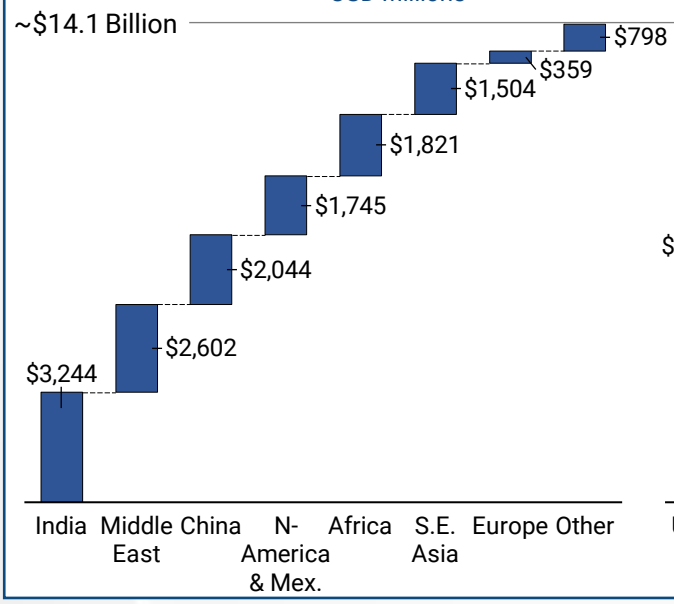
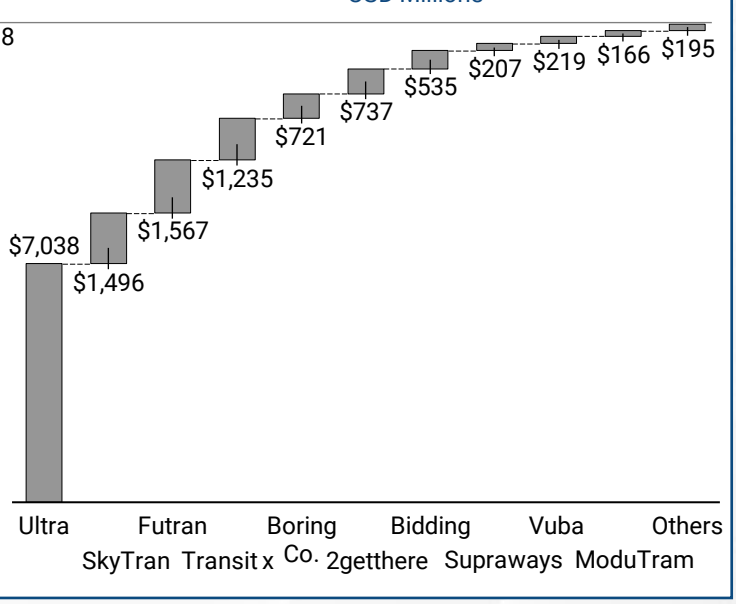


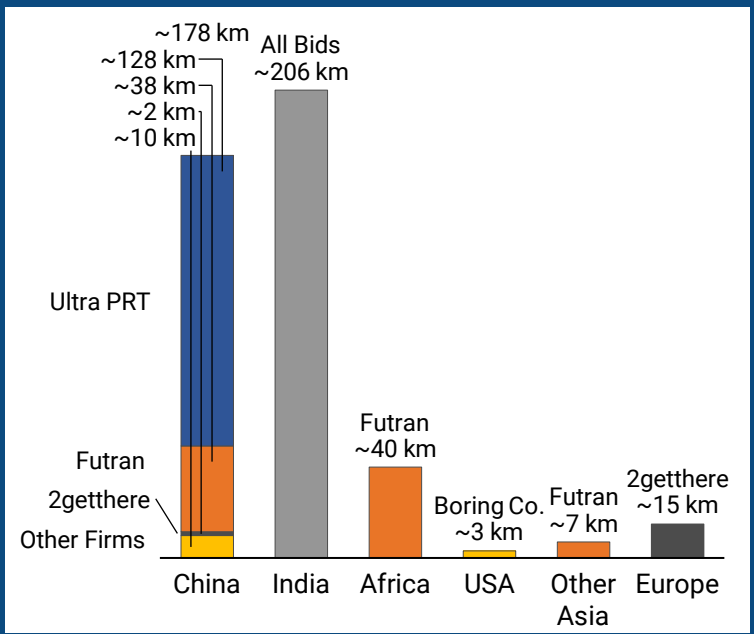
Figure 22) Expected-to-Close Pipeline By Vendor
USD Millions



As Figure 22 and 23 illustrate, Ultra PRT has the largest portion of this adjusted pipeline. $7 Billion isn't unrealistic for Ultra when one considers that's 10 to 16 projects breaking ground over the next five years from their global pipeline of over 200 opportunities. We note again that we are likely underestimating SkyTran's pipeline given they have similar resources to Ultra and a similar multi-region footprint. SkyTran declined to comment for this research.

The other 12 PRT provider firms constituting this group will suggest their prospects are being underestimated since delivering 7-14 projects seems easily attainable. This is by Praetor design: the probability adjustment for this set indicates a few of these firms shall succeed, and several others shall, unfortunately, fail.

Figure 23) Contracted & Bid-Stage PRT Projects in KM



An important consideration for size of the $14 bn Expected to Close Pipeline is the set of PRT projects that are already under construction, contracted with the various cities and states in question, or those out for competitive bids following legislative approvals.

Together these 18 vanguard PRT generation 2 (G2) projects constitute ~446 km of track or over $3.7 bn of project CAPEX.

Contracted does not yet mean financed. However, the banking and investor discussions are typically well advanced by this stage as a normal part of the process with the city or state in question.

This set of vanguard projects is expected to enable PRT's growth through demonstrating its attractive transit attributes and profitability.

PRT SYSTEM INFRASTRUCTURE & TECHNOLOGY PPP PROJECTS

The 'Expected to Close Pipeline' is a set of PRT system infrastructure projects.

PRT transportation network projects will typically be structured as public private partnerships (PPP) under the track owner entity: a special purpose vehicle (SPV). The city or state government shall contribute the PRT concession and is a key participant in fare, right of way, financing and risk management decisions.

We examined the economics of PRT projects in Section 1. Small and mid-sized projects with low-priced fares will likely require a public contribution to the capital cost of the system. Private funding can be raised in combination with public funds if the project economics provide for a sufficient return for the accompanying level of risk. Such projects may be suitable investments for institutional capital. Large city-wide PRT projects are—as previously indicated—the on-demand transportation industry sweet-spot. The expected returns under different fare levels are illustrated in Figure 13.

The expected project financials of recent large PRT project proposals in both the developed and developing world provide returns and debt service coverage ratios that exceed the top credit rating benchmarks (1.5 to 2.0) for infrastructure projects. PRT projects should be a promising sector for alpha yields.

PRT INFRASTRUCTURE & TECHNOLOGY PROVIDERS

Vertically integrated PRT companies provide the all-in PRT system solution for customers. They typically work in partnership with the public entities to provide PRT products and services to the Special Purpose Vehicle PPP. Different firms have different business models, but the sources of revenue include:

During PRT system development:

1. The provision of key components and technologies during PRT system construction like vehicles, the guideway beams and columns, the fleet and vehicle control systems and the booking system. These will tend to be provider-owned technologies (for example ModuTram and 2getthere's proprietary vehicle control systems and vehicles) or those licensed from other vendors (Ultra PRT technologies licensed in China)
2. The provision of engineering and related PRT project development consulting services, including potentially oversight of the entire project

Once the PRT system is operational:

3. PRT Track operational management services and system maintenance services.
4. Minority participation in the equity cash flows of the PPP SPV. This arrangement would be negotiated on a project-by-project basis. It requires attractive forecast project financials to be feasible and is more likely under the use of high project gearing (80%+ debt). It is this SPV participation contribution – cash income with no direct operating costs - in the case of large systems that has the potential to produce high profit margins for PRT provider firms

Two additional sources of PRT related income for both provider firms and their city partners is, first, real estate speculation and development based on planned PRT routes. This *value capture* option has been used successfully by Hong Kong, Japan and the PRC to finance transit systems. The potential of such speculation is clear and doesn't require a detailed examination or explanation in this research.

Second, a modest income stream from the track hosting utilities such as cable and mobile telephony towers and system infotainment. This small income stream doesn't warrant examination in this research either.

The set of active PRT providers follows.

PRT Is a ~$45 Bn Investor Gain Opportunity: 4) Multiple Attractive Entry Points

PRT Provider Company	Offices / HQ	PRT Tracks Under Contract or Construction	Full Loop Test Track With Stations	Control System Status	Probability-Adjusted Pipeline Estimate	Raising Equity Capital in 2021?	Valuation	Notable Points
ultra global prt	• Bristol, UK HQ, • Offices in China & India	• Chengdu Tianfu Airport China (MTS estimate 10 km) • Jilin Province China (est. 120 km over three phases)	• Full sized test track in Bristol, UK • Some R&D in India	• Control system G1 is in operation • G2 & G3 under development: track testing (JV with Singapore)	• ~$7 billion • Strong presence in India, China, SE Asia, Middle East	• Yes	• Confidential	• Estimated revenue p.a. $4 m • Pioneer in C21 PRT with Heathrow T5 system • Developed new steel guideway design • Manufacturing facility in India may be the first of several to attain scale (automaker JV) • Worked with Indian states to pass PRT legislation
skyTran	• Irvine USA HQ • India (Owner Reliance)	• None	• Texas • Sub-scale in California USA	• G1 Complete • G2 Refinement and testing on TX track	• Bidding on several Indian and Middle East opportunities • Estimate $1,5bn (likely too low)	• Reliance Industries just acquired a majority stake in SkyTran (owns 54.5%) for $27m at an implied $95 m valuation. • Prior valuation $180 m.		• SkyTran declined to comment for this research • Technology development focused on magnetic levitation and high-speeds
FUTRAN PODCARS	• South Africa HQ • China: Changsha and Jiujiang	Four under contract: • Sub Saharan Africa 40 km • 2 in China (38 km) • Philippines (7 km)	• Yes. The third test track is under construction in China	• Developed: Awaiting track testing in China	• ~$1.6 billion in sub-Saharan Africa, China and India	• Raising capital currently	• Confidential: Request specifics from Praetor	• Manufacturing facilities in China and Africa • Solar energy is a significant part of the business model • Winner of several green and structural steel innovation awards
TransitX	• Boston USA HQ • Georgia USA	• None	• None	• None currently • Plan to customize for each system by development partners	• ~$1.2 billion with a significant amount in Asia, the US and the Caribbean	• Raising project financing	• N/A Debt financed company.	• Global reach with representatives in 20 countries • Transit X has developed over a thousand proposals for systems across the world • Development partnerships include Altran, AECOM and Arcadis
2getthere	• Utrecht, the Netherlands (HQ) • Munich, Germany • Friedrichshafen, Germany • Abu Dhabi, UAE • Dubai, UAE • Singapore	• Rivium Business Park Netherlands • Brussels Airport Belgium • 2x RABus in Mannheim and Friedrichshafen Germany • SMRT Mandai Depot Singapore	• In Utrecht (the Netherlands) and Orlando (USA)	• G2 Complete and in operation Masdar • G3 in delivery at Rivium business park • G3.5 and G4 in development	• ~$740 million • Two very large system proposals in the USA and a world-wide pipeline	• No	• Confidential	• The only PRT provider to have developed and delivered several podcar systems • Only supplier of pods that operate on shared grades with other traffic without safety steward on board • Secure financial profile as part of ZF Friedrichshafen
THE BORING COMPANY	• California USA • Austin USA	• Las Vegas Loop (3 km)	Test tunnel at Hawthorne, California	• Tesla vehicles control system	• ~$720 Million includes L.A., Austin, East Coast and Florida opportunities	• Not known	• $500 –1000m reported	• Boring Co. declined to participate in this research • Subterranean tunnel approach • Tesla cars at high speeds • Elon Musk-backed company

PRT Is a ~$45 Bn Investor Gain Opportunity: 4) Multiple Attractive Entry Points

PRT Provider Company	Offices / HQ	PRT Tracks Under Contract or Construction	Full Loop Test Track With Stations	Control System Status	Probability-Adjusted Pipeline Estimate	Raising Equity Capital in 2021?	Valuation	Notable Points
ModuTram	• Guadalajara, Mexico	• None	• Yes, full track with full sized station, including ticketing in Guadalajara	• G1 Complete and in operation on test track. • G2 Under development	• ~$170 Million	• Raising capital currently	• Confidential: Request specifics from Praetor	• 160,000+ passengers served (real + virtual) on test track • Several technology and research partnerships like CINVESTAV, BECCAR, BEA. • Fully established supply chain. • Certifying control system to highest EU safety standards
SUPRA WAYS	• Lyon, France	• None	• None-currently constructing 50m segment in 2021 • Planning to have a full test track in place by 2023/24	• Under development with partners	• ~$210 million • Focusing on 3 Cities in France, a few outside	• Yes, Series A	• Confidential	• Partnerships include ESTACA, DEMS and Univ. Lyon and Paris Sorbonne • Suspended system with solar • Focuses include automotive industry collaboration and safety
vuba	• Denver USA • Kigali Rwanda	• None	• Scale test track under construction Colorado Springs USA	• Yes. Licensing a G1 Control System	• ~$220 million • Focus is 144 km Kigali system	• Raising capital currently	• $7.1 Million – crowdfunding currently	• Vuba Leadership overlaps with ATRA and PRT Consulting • GFRP Guideway design • Suspended system switch patent pending
BeemCar™	• United Kingdom	• None	• None currently • Planning to establish a Mobility Institute in the UK. This will provide BeemCar with its PRT development platform		• ~$90 million: One large system in Dubai	• Yes. First round in 2021	• Confidential	• Carbon composite guideway • PRT positioned as a natural smart city component • Dubai opportunity came from Accelerator participation
SWIFT Rails	• Buffalo, USA	• None	• Small partial track. • Construction of full-size test track planned for Q2 2021	• G1 Under development inhouse	• Under $50m • One short proof of concept track planned	• No	• Just completed successful seed crowdfunding round at $9m valuation	• Single-person PRT vehicles
JPods	• Tulsa USA	• China Contracted 10 km	• Partial track • Testing on small CA track	• Developing G1 control system inhouse	• Boston, USA 1 mile (Legislature approved) • Atlanta USA 2 miles	• Raising capital for projects, not for the company	• Confidential	• Dozens of proposals in the USA • First tracks are short proof of concept tracks in USA • Developing the technologies for the China system in the US

PRT Is a ~$45 Bn Investor Gain Opportunity: 4) Multiple Attractive Entry Points

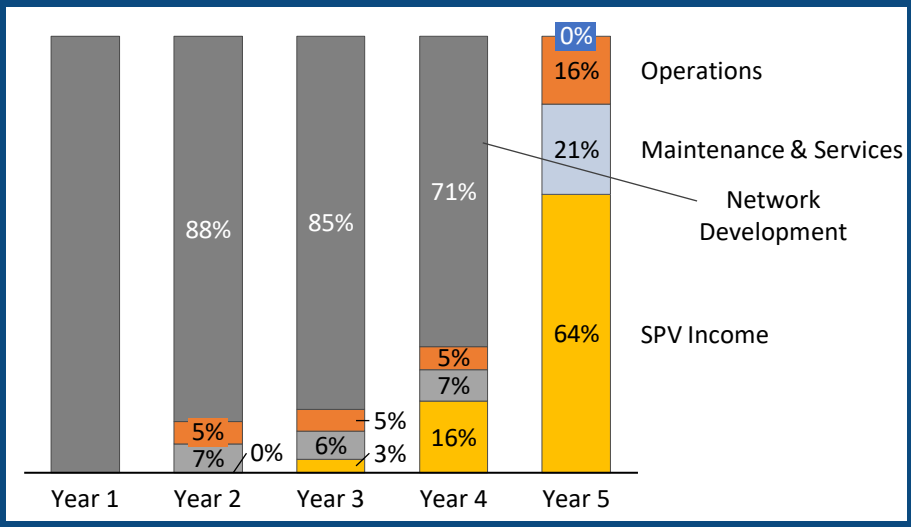
Illustrative

Figure 24) Illustrates the composition of Gross Profit for a PRT firm with one medium-large project ($700 million CAPEX or approximately 60 stations).

Most gross profit is from project development spread over four years in this case. Operations, maintenance and services profit increases as the project becomes operational.

SPV income is the free cash flow from an equity stake. In this case, we modeled a 20% stake. This should theoretically offset lower development margins as projects produce higher returns by virtue of a smaller capital base.

Figure 24) PRT Provider Gross Profit - $700 million Project



The expected financial performances of both the infrastructure project SPV's and the PRT Provider firms is relatively consistent across the industry, in the experience of the author, considering the specifics of the track and the provider firm focus (integrator vs. vertically integrated).

Since we've examined the high-level financials of the PRT Projects previously, we turn to a comparison of the public on-demand transportation firms versus the expected PRT Provider firms' industry performance over time as projects come onstream. The baseline for the PRT firms' financials is the 'Expected to Close' PRT project pipeline revenue.

The expected financials comparison of Figure 25 illustrates the potential of PRT to be the 'sweet spot' of on-demand transportation.

Although the public peers are much larger than the emerging PRT industry, more established and with more time for their financial performances to mature, the PRT industry is expected to be more profitable at the EBITDA and NOPAT margin levels.

The financial returns (measured as Return on Equity or ROE) are significantly higher owing to the relatively capital-lite nature of these firms' operations, maintenance, services and SVP income streams. The various PRT system assets are on the SPV balance sheet.

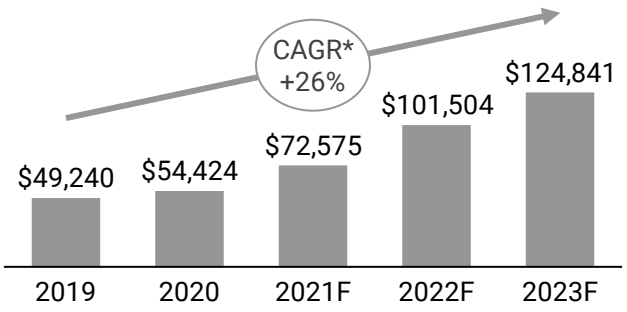
NOTES ON COMPANIES NOT IN THE PRT FIRM TABLE

- Unitsky String Technologies Inc. is a potential PRT company. However, their solution is technically more like a modified cable-car than a PRT guideway
- There are several PRT companies that appear inactive and, according to industry insiders, effectively no longer in business. They didn't respond to several requests to connect and in many cases their emails are invalid and websites offline. These include industry pioneer Vectus, plus Taxi2000, Metrino, PRT International, Beemways, TubeNet and others. We apologize in advance to these firms if this isn't the case. However, being inactive is reason-enough to not be featured in this research.

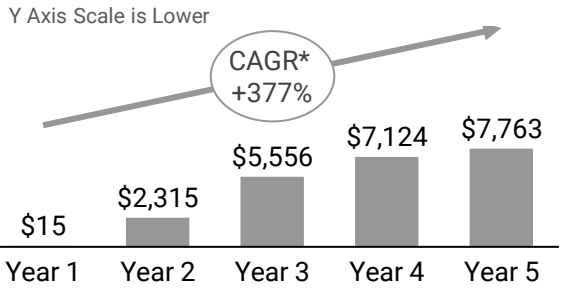
Figure 25) Financial Comparison / Forecast Between Public On-Demand Peers and PRT Providers

Illustrative

Public On-Demand Transportation Peer Group

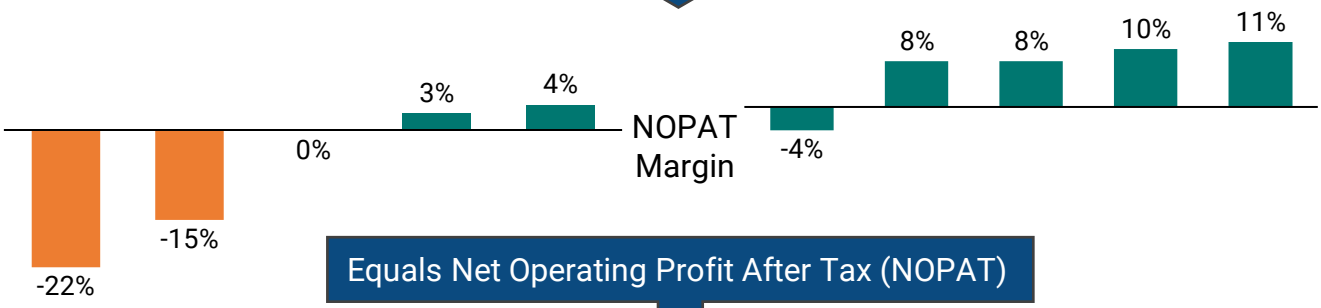


PRT Providers Based on Their 'Expected to Close' Aggregate Pipeline



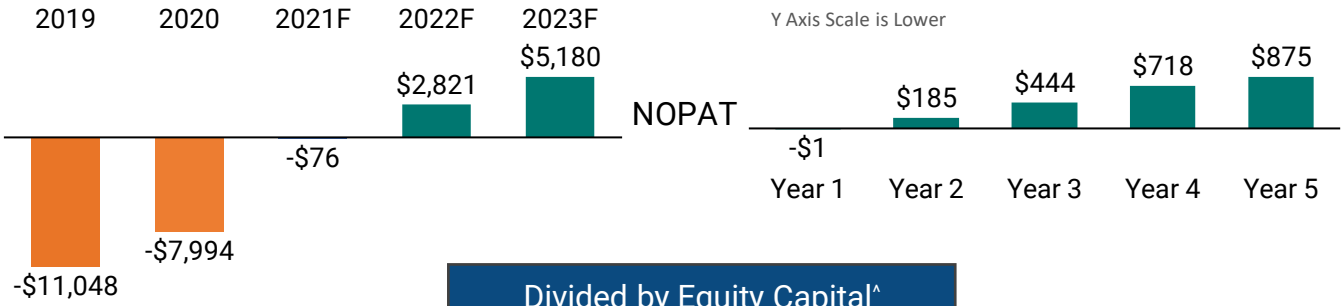
Revenue

Multiplied by NOPAT Margin



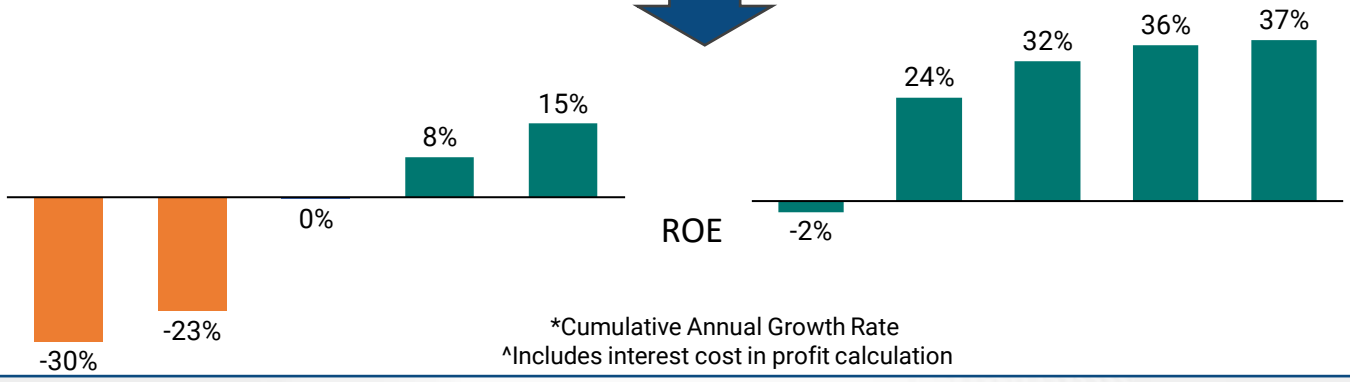
NOPAT Margin

Equals Net Operating Profit After Tax (NOPAT)



NOPAT

Divided by Equity Capital^
Equals Return on Equity (ROE)



ROE

*Cumulative Annual Growth Rate
^Includes interest cost in profit calculation

THE INVESTOR PRT VALUE OPPORTUNITY / GAP IS DETERMINED USING THE DATA FROM THE MARKET SIZING AND PRT PROVIDER INDUSTRY ANALYSIS*

There is a significant value creation opportunity for investors. Put differently: a PRT provider firm company valuation gap based on the sector's expected financial performance, the pipeline that is expected to close and the market opportunity.

'BOTTOM UP' VALUE OPPORTUNITY / GAP USING THE EXPECTED INDUSTRY FINANCIALS

The Value Gap is metrics-based on the expected financials of the $14 billion PRT project pipeline, discounted to today using the cost of capital.

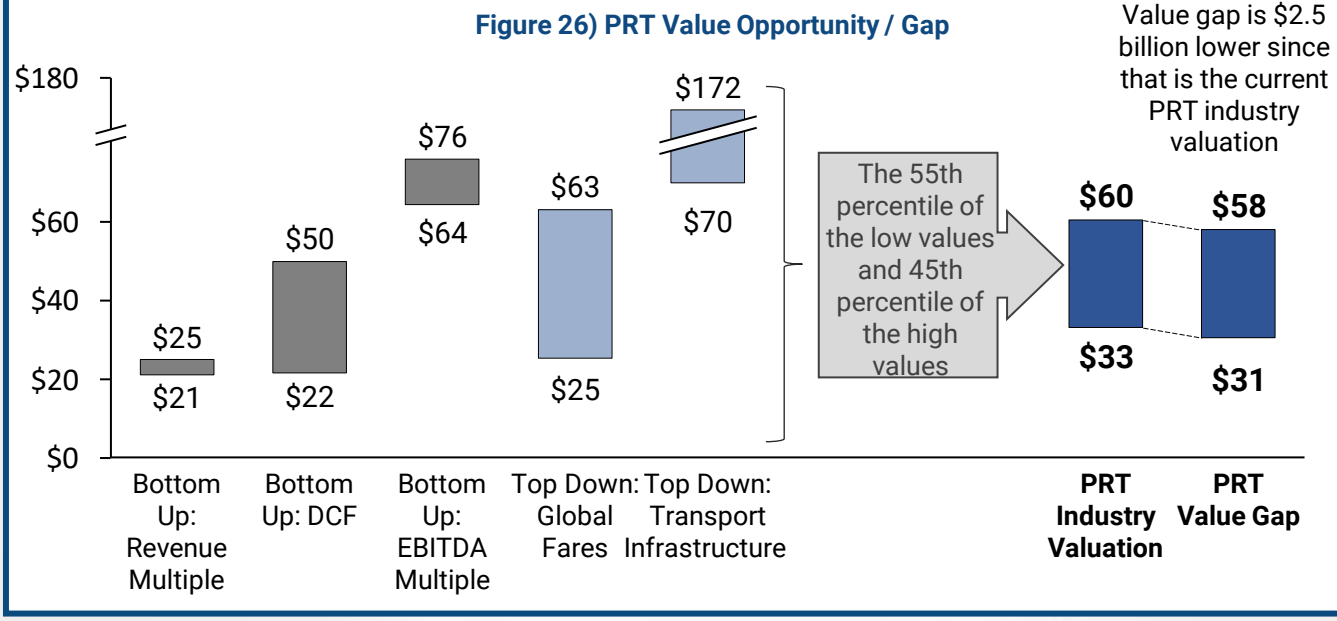
- Revenue multiple range is Year 3 PRT Firm revenue multiplied by the 5.8x on-demand transport multiple and discounted for 3 and 5 years for the high and low estimates respectively
- Discounted Cash Flow (DCF) is the expected PRT Firm free cash flow NPV with 3 and 5-year periods before cash flows start for the high and low estimates respectively
- EBITDA multiple range is Year 3 PRT Firm EBITDA multiplied by a 125x multiple (2021 on-demand transportation multiple is 257x, we use under half of that figure) and discounted for 3 and 5 years for the high and low estimates respectively

'TOP DOWN' VALUE OPPORTUNITY / GAP USING THE MARKET SIZING

- The global set of new PRT tracks can attain a 0.5% (low end of range) to 1.25% (high end of range) market share of transit fares, by Year 10, discounted.
- The PRT Providers transportation infrastructure development share is 0.5% (low end) to 1.25% of global spend by Year 10, discounted.

The 55th and 45th percentiles of the low and high values respectively from the five estimates provides the PRT firm industry valuation. The resultant current PRT value opportunity / gap is $31 to $58 billion

Figure 26) PRT Value Opportunity / Gap



*We assume the various PRT firms can raise the approximately $120 million of investment they require to deliver on their pipeline opportunities. This applies only to the undercapitalized small firms, not the majors like Ultra and SkyTran

A significant portion of the value opportunity / gap calculation is the time it takes for PRT to attain its expected financial profile. We know from the cost advantage and competitiveness assessment that PRT has several competitive advantages over other transit modes.

However, we also know that any transformative change in society takes time:

- The previously mentioned transit system purchasing process, as a near term sales obstacle, lengthening the sales cycle
- Changing customer behavior takes time. On-demand transport requires a behavior shift in how customers access transport services. Whether this is shifting people from cars to PRT or having current bus or moto taxi customers switch modes, changing customer behavior is difficult. Surveys show that once customers try on-demand transport, they become major advocates, but they must be persuaded to try it first.

Aside: Praetor is aware it may be underestimating the value gap

Praetor acknowledges there are reasonable arguments why we may be underestimating the value gap:

- The Value Gap is based on the current 'expected to close' pipeline of PRT projects and ignores the disruptive potential of PRT
- No accounting for a 'land rush' of systems that means the share of transit will be much higher than 1.25%
- Praetor has used lower than current on-demand peers' EBITDA multiple
- The pipeline figures are too low for SkyTran, which could total $5 bn+

Praetor's view is although these are reasonable points, industry development will take time, nonetheless.

Aside: Portfolio play: Invest in all undercapitalized firms – only one needs to succeed

If Praetor's hypothesis is correct, the returns expected for PRT investments can't be located on CAPM's *efficient frontier*. They are many magnitudes too high to balance the risk of losing your full investment, literally 'off the chart'.

This provides a portfolio option: With the notable exception of the PRT industry giant Ultra, which has a sizable valuation, it's possible to capitalize almost every other PRT peer for $80 to $120 million in total and avoid most *specific risk*.

We estimate, and this depends on individual valuations, this investment can provide a 100% return if only one peer moves up to near unicorn status and all the rest perish.

Section	Why is there a ~$45 Bn Investor Gain Opportunity?
5	Because resources and one large PRT project will overcome the reasons for the current value gap

Large value opportunities / value gaps are rare in finance. There are usually good reasons for them, typically information gaps and different perceptions of expected performance and risk. We examine why the PRT value gap exists in the following, and what it will take to close it.

PRT industry executives tend to agree on the major reasons the industry hasn't yet demonstrated its potential when the business economics of C21 PRT have been clear for over a decade. In Praetor's view, the root cause of many barriers to PRT's success is politics, not economics.

The industry has underestimated the degree to which PRT is a paradigm shift for public urban transportation system buyers and influencers, and the effort it will take, customer by customer, to overcome the natural resistance to such a shift.

On-demand transportation, and PRT specifically, is the equivalent of a new language that transportation planners can't easily speak. These professionals operate in the structured, rules-based environment that worked well for C20 transit purchase decisions - one that's ill equipped for the requirements of PRT procurement. They don't have the technical, financial and risk tools to evaluate or develop such innovative systems.

And it's not just a paradigm shift for PRT procurement specialists and their related legislatures. PRT also doesn't fit into typical infrastructure financier mandates of long-term projects with low yields and an accompanying low risk appetite.

Paradigm shift,
noun *a fundamental change in approach or underlying assumptions* Oxford Languages

From	▶	To
Large vehicles are needed for high passenger volumes	▶	Small vehicles move 20,000+ passengers
Human vehicle control	▶	Perfectly safe automated vehicle control
Public financing of loss-making transit systems	▶	Private financing of profitable transit systems
20 km Transit system that costs $ billions	▶	20 km PRT System that costs $ millions
Large systems mean unprofitable routes and low fare recovery	▶	Network effects make large PRT systems more financially attractive
Linear PPP procurement process with clear responsibilities, metrics and established laws	▶	A long-term and flexible collaboration

The paradigm shift manifests in several of the concerns industry executives frequently encounter, and some beyond these:

- *"We'll build (or finance) the second PRT system"*
- *"The expected project financials look impossibly good for a transit project. We can't trust them"*
- *"Small vehicles surely can't move higher volumes than BRT"*
- *"The technologies are too risky"*

This paradigm shift challenge shouldn't be overstated, however: there are an estimated 18 early-adopter airports, cities and states that are currently moving ahead with PRT projects.

Overcoming this modest natural resistance to change requires resources. Time and capital in particular:

- Time and the capital to work with each potential public customer to address the challenges of a linear PPP process for PRT procurement and ill-suited contracts and performance metrics. What may be necessary - and what several providers like Ultra, Futran and JPods have attained across different markets – is a change in local transit regulator rules or procurement regulations.
- Time and capital to lobby for country-wide legislation to suit on-demand grade-separated transportation broadly, and PRT specifically. This should also assist in securing the industry's share of central infrastructure spending and grants. One example is changing the current ASCE 2013 'brick wall stop' standard that effectively requires large headway distances between automated vehicles. This is expected to be removed for PRT vehicles in the 2021 ASCE standard.
- Time and capital to evangelize PRT in the public domains. All PRT providers do this to some degree, but the majors Ultra and 2getther are consciously taking the lead in closing the information gap. This can take several forms going forward:
    - A permanent PRT lobby in the various capitals
    - Establishing an ATN / PRT journal
    - On-demand transportation institutes (such as the BeemCar initiative in the UK)
    - Increased sponsorship of research and demonstration projects by consulting firms, institutes and academic institutions

The most likely candidate to lead an industry-wide effort is ATRA (Advanced Transit Association).

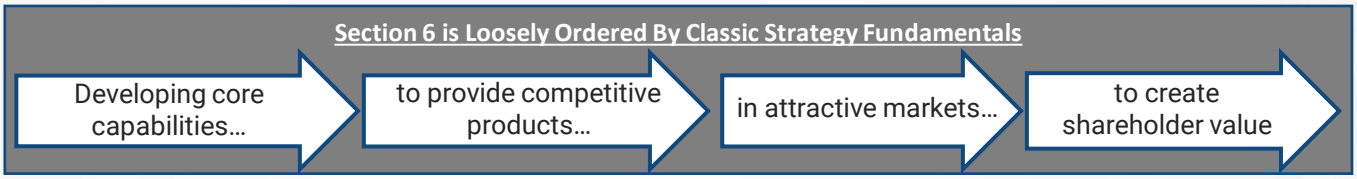
We expect that a widely publicized and successful large terrestrial PRT project should greatly aid this PRT industry requirement. The favorable business economics and competitive advantages of PRT will make themselves known rapidly once that occurs.

There are other concerns with PRT that are either Perception, Performance or Information Gaps and contribute to the value gap.

CUSTOMER AND FINANCIER BARRIERS TO PRT ADOPTION	GAP TYPE & PRAETORS PERSPECTIVE
Many transportation planners and investors have never heard of PRT from credible sources.	**PERFORMANCE GAP & INFORMATION GAP** PRT has had its fair share of eccentric characters historically in the group of true believers. And there has been some potentially damaging past behavior with clients and consulting firms. The PRT management teams have not tended to be comprised of the proven talent institutional capital prefers. However, this is changing with The Boring Company and SkyTran's high-profile investors and executives.

CUSTOMER AND FINANCIER BARRIERS TO PRT ADOPTION	GAP TYPE & PRAETORS PERSPECTIVE
PRT appears so futuristic that there must be many technology barriers to overcome	**INFORMATION GAP & PERFORMANCE GAP** There are several C21 PRT systems in operation today with perfect safety records. And all the technologies required for PRT G2 already exist.
The investment timeline is too long – we (investors) need a faster exit.	**PERFORMANCE GAP** Project financial structuring can address this requirement by providing a mechanism for an earlier exit
Attaining the right-of-way for PRT tracks will be challenging	**INFORMATION GAP** This is true in most Western nations where the transportation right of way is private property. However, the road-based right of way for PRT can overcome this concern to a large degree.
Self-driving cars will be the future of urban transport.	**PERCEPTION GAP** See Section 2 and the MACP Chart in the Appendix. There is room enough in the urban transportation crisis for self-driving cars and PRT to coexist. They are both competitive any-point-to-any-point urban transit modes.
Consulting firms don't understand PRT and aren't able to accurately assess its potential and feasibility	**INFORMATION GAP & PERFORMANCE GAP** This is historically the case, and several potential PRT projects (e.g., San Jose and Park City in the USA) have not been accurately assessed. Capital cost estimation has been a particular issue. There are capable PRT consulting firms (for example PRT Consulting and Systra), and this list is expanding with the likes of 2getthere and Ultra working with multiple consulting firms currently.
There aren't accepted PRT technical standards	**INFORMATION GAP & PERCEPTION GAP** This isn't correct: The American Society of Civil Engineers (ASCE) includes ATN/ PRT within the family of automated people movers (APM) safety standards. The EU has driverless train standards for control systems
There are too many significant risks	See Section 7: Risk Management

Section	Why is there a ~$45 Bn Investor Gain Opportunity?
6	Because we expect several PRT firms with smart regional strategies to prevail, but consolidation will create value for many



Core PRT Capabilities

CORE CAPABILITIES

There are several core capabilities in PRT which are highlighted throughout Section 6

Capability 1) Vertical Integration Early in Industry Development

PRT is an industry where vertical integration with select technology partners is a smart strategic choice for provider firms at this early stage.

There are three primary reasons for this: First, every PRT system has a single (and captive) customer who requires track operations and maintenance services. Both are easiest and most profitable to provide when the firm services its own equipment, like elevator providers and auto dealerships.

Second: there isn't a PRT-focused supplier that has operational scale currently.

Third: continuous innovation, design and testing is required as the industry develops PRT system engineering. This is easiest, literally and figuratively, under one roof. As the industry develops, the benefits of vertical integration need to be weighed against best of breed benefits.

Capability 2) Top Engineering Talent

PRT is vehicle, software and infrastructure engineering. The industry's development has been partly - and by necessity - marketing-centric to this point. However, the leading firms will separate themselves with top quality engineering talent and the best solutions for the myriad of system challenges. Of note is developing vehicle guidance in supported open guideway systems and the switch in suspended rail-based systems.

Capability 3) World Class Control System

The integrated fleet and vehicle control systems are a key capability for PRT system performance and passenger volumes. This requires testing on a physical test track and continuous development. Praetor's view is you should only develop your own system in-house if you have sufficient resources, both time and talent. A more reliable option is licensing an existing control system or partnering with a control system specialist firm. This is the specialist domain that may induce technology firms like Tesla and Waymo (Alphabet) to enter.

Capability 4) Solar Energy

As described in Section 1, Solar energy reduces operating costs and adds an additional 'green' dimension to PRT's attractiveness. This is a 'must have' option for customers in suitable locations, and hence a key PRT capability.

Capability 5) True Partnerships

Partnership development and maintenance will be as important in PRT as in other infrastructure engineering industries. There are several to consider presented here and following.

In PRT, city and state customers are also long-term partners. The importance of this relationship can't be overstated. If the PRT firm doesn't have strong political backing, vocal support and contracted commitments for the track right of way (ROW), fare pricing and for ongoing operational and financial support, expect setbacks. Put simply: there is no PRT without political will. PRT has already seen an advanced project stopped in India (Amritsar) when Ultra walked away due to fare flexibility concerns.

COMPETITIVE LANDSCAPE & PRODUCTS

The competitive advantage of PRT over other transit modes is addressed in Section 2. We'll focus on competitive dynamics within the industry in Section 6. However, selecting likely PRT *winner* and *loser* firms is beyond the scope of this research. Praetor Capital may develop firm-specific views in future research.

For PRT system providers to remain competitive as the industry develops, ongoing R&D will be needed – a Kaizen approach. We expect vertically integrated firms will initially coexist with best of breed providers who act as integrators. Some modules – like specialized electronics, displays, solar arrays and propulsion systems – will naturally be provided by specialist firms.

Any industry that has outsized profits – like large PRT networks are expected to – will rapidly attract competition. Expect the technology, automobile, train, energy and infrastructure majors to rapidly respond. And private equity, attracted by 20%+ IRRs and ROEs.

The PRT first-mover advantage will provide a solid platform for a few companies, with Ultra and 2getthere currently leading. 2getthere has delivered the most PRT solutions and has several contracts in hand. Ultra has the largest sales pipeline and the resources to execute it. SkyTran and Futran are in pursuit of these two. The advantage isn't theoretical: Ultra has already physically engaged with over 200 cities, and assuming they stay engaged, will be challenging to displace in those locations. Even as these opportunities may progress to closed bids: the incumbent is favoured. The one area of competition that is an open question - and will play a role in bid success - is which PRT firm will deliver the best 2nd and 3rd generations of PRT technologies?

One competitor worth singling out because of its high profile and notable investor (Elon Musk) is The Boring Company. It considers itself a PRT company and could bring much needed attention to the entire industry. Praetor expects it to focus on point-to-point tunnel loops for the next few years, addressing single route needs. It will take a good deal of time and R&D to have Boring Company compete for city-wide networks, and the cost of tunnelling is unlikely to ever drop below $10 m per km.

Siemens, Google/Alphabet, Alstom, BP Lightsource and Uber, among other likely entrants, will need to do their own PRT engineering and develop their own PRT manufacturing lines. This will take time. However, they will catch up in pursuit of high yields. And the imperative to provide a low-cost system - the likely strongest strategic position in transportation infrastructure - will mean that scale will prevail in PRT, as it does across other industrial sectors.

For this reason, the little PRT armies will need big friends (apologies to Sun Tsu). PRT firms can't easily compete with Honda's cost control, Waymo's developers or BP Lightsource's reach into governments globally. PRT Providers will hence need to collaborate with the majors to attain operational scale (like Ultra' automotive JV in India) and form go-to-market consortiums. This doesn't preclude PRT firms from having a global presence and insourcing selectively, the point here is collaboration is required in some form.

This leads us to **Capability 6) Capital.** The cost of demonstrating PRT systems is a barrier to entry. Design and engineering R&D, a full-size test track, long sales cycles and contributions to feasibility studies require $15+ million of capital. There are PRT firms that suggest they can succeed with far less capital – Praetor will be pleased to be proven incorrect on this point.

At the micro level, working with a potential public client and maintaining staff in that city will be required for successful PPP partnerships. Local knowledge and a system to suit local demand and environmental conditions is required.

For this reason, we don't view what one industry executive referred to as 'drive-by proposing' as the route to success. This may be doing the industry a service in promoting PRT as a viable solution, but PRT isn't, by its complexity, an impulse purchase. The procurement process takes time.

Further, the firms that have an operational presence in the markets that they serve will find contracts easier to attain. This doesn't necessarily add to the cost: pods can be assembled near the track from components and modules, and guideways are always assembled onsite. In this manner, regional firms should attain success with large manufacturing facilities serving a network of assembly and maintenance facilities located near customers.

Attractive PRT Markets

ATTRACTIVE PRT MARKETS

More positive, strategically, for small PRT firms is the enormous market size, explored in Section 3. To recap: there is sufficient demand to support several competitors per region in a global market where the developing-world is the sweet spot.

Further, PRT's growth will enable it to compete in adjacent markets such as solar power, automobiles ('own your own pod') and telecoms / media on a regional basis. This is already evidenced by Futran planning to provide power to the Southern African grid and Reliance's recent acquisition of a controlling stake in SkyTran. This transaction is partly viewed as a renewable energy play.

Most of the developing-world is well covered by PRT firms Ultra, Futran, SkyTran and Transit X. The one region not well served currently is South America. This is an opportunity for regional firms ModuTram, SkyTran and Transit X.

As attractive as developing-world markets are, their financial characteristics require strong risk partnerships. Project returns must exceed local currency *cost of capital* thresholds (typically 12 to 18%). And the capital market infrastructure and risk products may not be sufficient for a large PRT system.

Creating Shareholder & Society Value

CREATING SHAREHOLDER VALUE

The uneconomic profits that PRT can produce in large systems will be balanced, financially, by more modest margins in smaller systems. The close to natural monopoly on system O&M contracts should ensure solid margins from both large and small system support activities.

It's notable that large firms like Ultra are pushing back on producing small systems –they're clear where the profits lie. There are several candidates for the first city-wide PRT systems. Some are already contracted (China and Africa) and others well advanced (USA, Middle East, India, China and Africa). One of these systems should provide the financial proof that sets the PRT industry on a rapid growth trajectory.

There are a few considerations when it comes to delivering alpha from PRT investments:

First, strong **Risk Management Partnerships (Capability 7**) are important. These can be EPC providers with their surety bonds and multinational financial institutions for derivatives and other risk products. This is of particular importance, as mentioned previously, in the developing-world where such instruments are few and typically illiquid.

Second: the cost of debt financing is a crucial PRT project consideration, particularly in developing-world cities where fares can't exceed ~$0.50 per 5 km trip. It also impacts PPP bid competitiveness. Praetor's view is partnerships with large financial institutions with strong balance sheets are essential. High credit ratings and ready access to debt markets will win contracts.

Third: For the PRT provider firms that survive – there are several small undercapitalized firms currently - and successfully deliver tracks, it may be enough to remain in business as the industry grows. The entry of the majors during the shakeout period will be a combination of building their own operations and buying others. As with any new C21 industry, developing the firm to be acquired is a smart tactic.

Fourth: As demonstrated in this research, the PRT firm value opportunity exists currently, and the risk/reward profile may be out of balance in an investors favour. If Praetor's hypothesis is correct, the gap will close.

Fifth: The financing of PRT infrastructure projects presents several opportunities to profit from multiple revenue streams. At the current early stage of industry development, the developing-world transaction negotiations will have a *frontier* quality in that there are few established transaction norms. For example: what portion of PRT SPV equity should the provider of *debt* receive in a highly leveraged transaction?

Hence, there's an opportunity to negotiate outcomes in PRT infrastructure projects that would not be possible in – for example – stand-alone energy projects. For financial institutions in particular, the list of potential income streams and fees is long: debt, mezzanine finance, equity placement, bespoke derivatives, currency trading and other risk solutions.

CREATING SOCIETY VALUE

The societal value that PRT can provide is described in Sections 2 & 3. To recap: PRT Adds value to society in several ways. Primarily through inexpensive, rapid, high volume and green transportation infrastructure.

As a new industry it will create jobs and contribute transit's demonstrated 4x economic multiplier to the local economy. For many poor countries, PRT would constitute an economic leap forward and a significant improvement to urban quality of life. And there is a legitimate business case for large systems in countries like DRC and the Dominican Republic.

Section	Why is there a ~$45 Bn Investor Gain Opportunity?
7	Because the risks of PRT can be addressed by suitable financial instruments and a partnership approach

The typical risks associated with large infrastructure projects are magnified in the case of a perceived new transit mode such as PRT without a financial and operating track record for large systems. For many financial institutions, the number and level of risks are a deal-breaker from the start.

PRT WILL REQUIRE A RISK INSTRUMENT PORTFOLIO

Multi-Risk Credit Guarantees

First, several of the largest risks – political, market and financial - can be addressed in combination with either a Credit Guarantee from an Investment Grade financial institution or a Sovereign Guarantee (or a combination of both). The Credit Guarantee – which typically covers shortfalls in debt service payments provides partial protection (<95% or with payout limits), depending on the SPV PPP project's risk profile, structuring and public commitments.

Guarantees are established project finance instruments, but Praetor is not aware of any previously priced Guarantees for PRT systems. Institutions like AFDB, ADB and GuarantCo have expressed an interest in supporting PRT systems with such products, but actuaries and bankers doing the pricing will not find the required historic statistics for the task (current systems aren't for profit). They'll have to be creative, and PRT CFOs and the public Finance representatives will have to be actively engaged in this process and guide the eventual transaction structure. And this may require a significant equity financing portion and other incentives such as mezzanine finance for the takers of this First Risk.

The first set of PRT Credit Guarantees could hence be relatively highly priced. However, with a handful of successful tracks (and track phases) to draw from the prices should shift lower on the credit experience curve. Praetor estimates the upfront cost should not exceed 2.5% and the annual cost 2% from institutions like multilateral development banks and insurance majors. And this doesn't preclude the banking majors and large funds from leveraging their balance sheets to provide such products, potentially as part of a complete transaction solution. For solar-powered PRT systems in developing-world nations, potential providers include Green Climate Fund, and MIGA, both mandated to cover risks that commercial institutions typically won't (MIGA is the most prolific Guarantee provider and focuses on political risk and its derivatives).

The cost of the Guarantee can be viewed as an upfront risk premium and an effective higher cost of interest. As demonstrated in Section 1, the financial profiles of large PRT systems should be able to absorb such fees.

System Development Bonds

Second: System development or project risks - technologies, counterparties and construction – can be covered by bonded contractors and comprehensive insurance. We don't know of any PRT projects that have been fully financed without a full-sized PRT test track demonstrating a functional control system and vehicles. The operational performance of the existing PRT systems should assist in this regard. Further, all PRT projects are likely to be phased, with key technical capabilities and the market performance proven step-by-step.

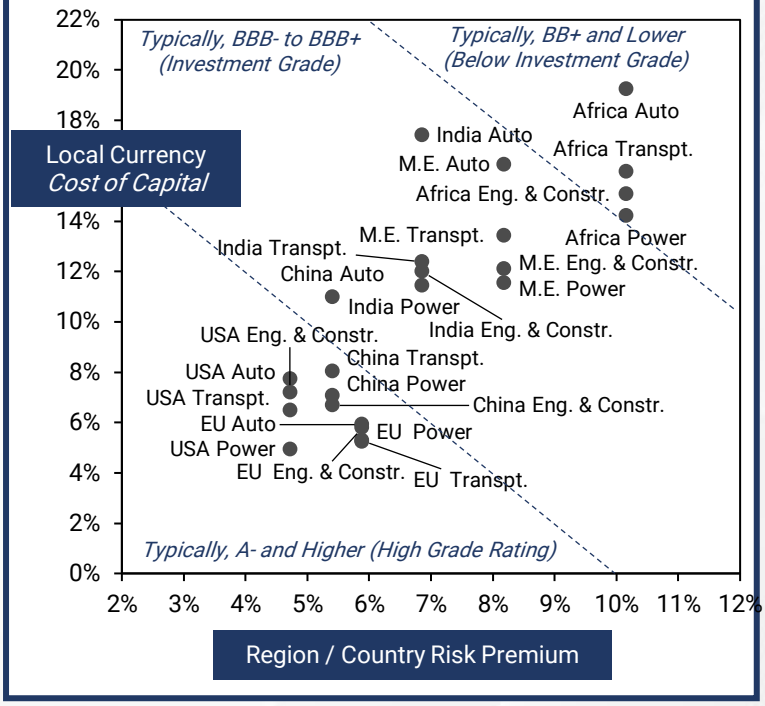
Bespoke Financial Hedging Solutions

Third: Any financial risks not covered by a Guarantee – which can include credit, commodity and currency risk – require direct hedging using derivative markets (SWAPS, options and futures). There may not be - in the case of African, Latin American and Caribbean states in particular – suitable derivative products or suitable liquidity in those products (or in forex) for large transactions. Such cases require the development of bespoke hedging products by financial majors, and / or special arrangements with Central Banks and regulators.

The City or State Customer Can Control Market Risk

Fourth: Customer demand risk and fare price risk (collectively market risk) is partially in the hands of the city and state in question. Fare pricing will often be regulated, and these fares can be adjusted, within political reason.

Figure 27) Major PRT Regions Financial Risk Environment



Traffic demand management is another tool a city can utilize to increase demand for PRT. If certain modes of transit are limited (for example the comparatively dangerous moto taxis) in number or banned outright, PRT ridership shall increase. Similarly, if city center space is converted to green space with no ground level traffic, or the city is a Smart City by design, PRT may be the only way to easily transit into those areas.

A long-term partnership approach shall work best for the provider PRT firm, SPV financiers and public body in question. Contingencies and resultant actions should be discussed and agreed upfront during the PPP process.

ASIDE: PRT RISK COUNTERPOINT

PRT Executives counter in risk discussions that *"the do-nothing risks are significantly higher for cities."*

In other words, the risks of the PRT project should be compared with the risks of continuing to rely on surface-based solutions. As proven worldwide, this leads to:

- Continued sub-optimal use of public transit with continued operating losses
- Significant growth in car traffic that matches and exceeds road development
- Increased congestion and longer trip times
- Large expenditures on road improvements that do little to improve the flow of traffic
- Little done to slow climate change

CONCLUSION: THE PRT VALUE OPPORTUNITY CONFIRMED

Over the seven sections of this research, we have introduced the PRT value gap or opportunity, sized it using two different approaches, and provided reasons why the opportunity exists.

The potentially attractive economics of large PRT projects provided the business case. Such projects should make attractive infrastructure investments with double-digit IRRs. The attractive financial profiles of PRT projects is partly based on the competitive advantages PRT has over other transit modes. High passenger volumes, solar power, light and small electric vehicles and on-demand trips combine to produce both low capital and operating costs.

Of note when PRT is compared to other transit modes is its solar potential, which enables cities to significantly advance their climate change goals through a single action. An urban PRT network is the carbon sequestration equivalent to planting a forest.

The market for PRT transportation networks (fare-based) and PRT supplier firms are both enormous, a combined $1.5 trillion per annum. This, combined with the likely PRT firm financials provides the $22 to $58 bn value opportunity.

We've illustrated that overcoming the value gap is a question of time and capital. Once the PRT firms have sufficient capital, and one large network proves the financials, they will be set for significant growth.

PRT's $14 bn Expected to Close Pipeline of projects could produce several $1 billion *unicorn* provider firms in the coming five years. And even if Praetor's research is partly incorrect, and *only* $7 bn of PRT projects break ground in the coming years, that should still mint a couple.

The PRT opportunity to this point has been hiding in plain sight from on-demand transportation investors, infrastructure investors and the financial media. It's not quite inexplicable how $82 bn of potential project CAPEX has slipped under the radar - Praetor and industry executives have several theories on why this is the case.

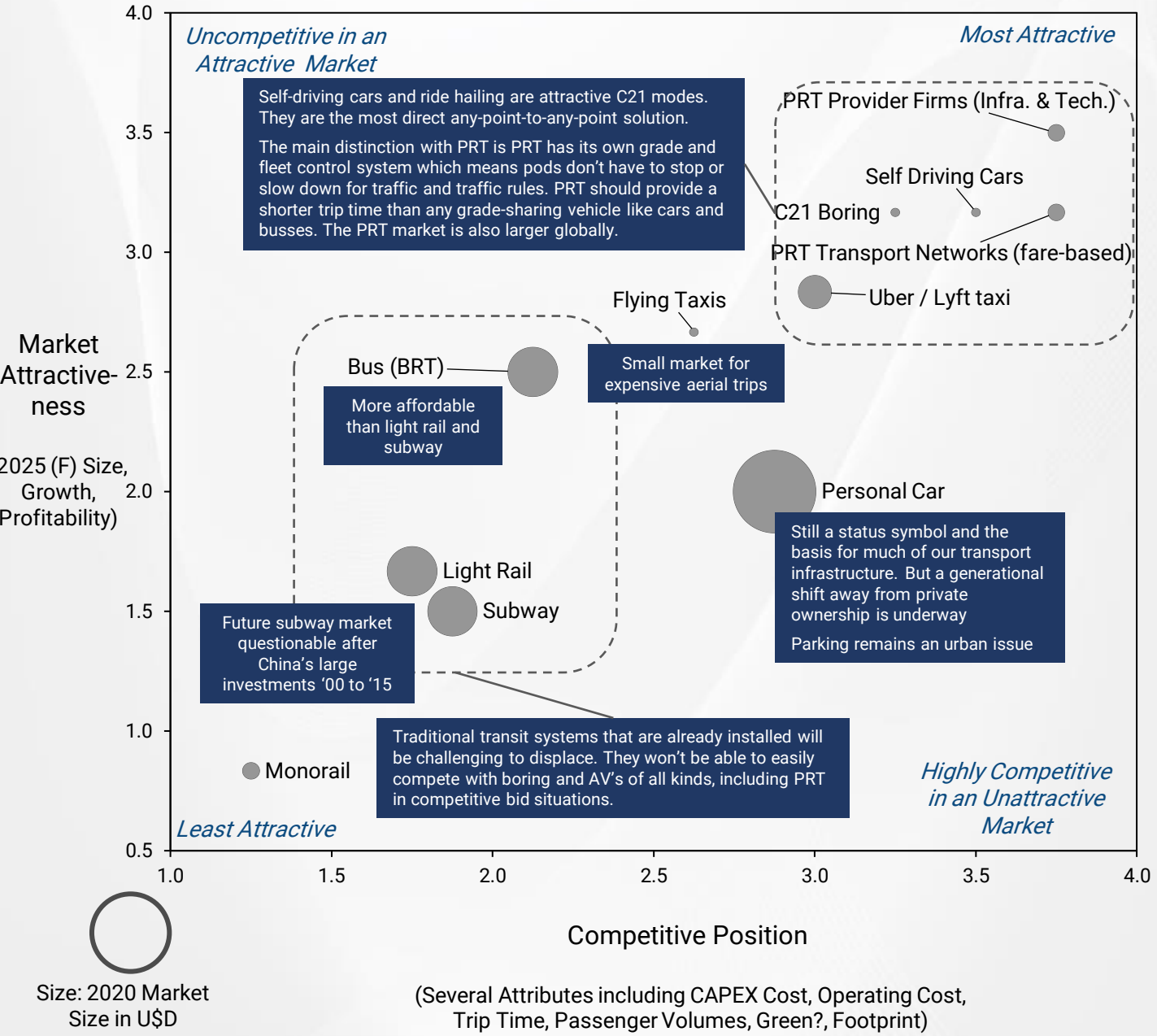
It is, however, surprising. And it likely won't last. The findings of this research can be considered a call to action.

APPENDIX

The data and findings of this investment thesis can be summarized on one traditional strategy chart: the Market Attractiveness & Competitive Position Matrix

The MACP should be cautiously interpreted as the dimensions can be simplistic. The value of the output is understanding the relative positions and the rationale behind the positions.

Urban Transport Modes Market Attractiveness & Competitive Position



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Jan has advised several PRT firms in the USA, Africa and Asia since 2018. His introduction to PRT was with Strategy Consulting Firm Booz Allen Hamilton in 2009 when he led the Booz team on a PRT commercialization engagement.

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