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The State of Fare Collection 2021

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Executive Summary

Masabi issued a survey in the late summer of 2021 to professionals working for transit agencies and operators around the globe, with a particular focus on fare collection teams. We wanted to better understand the fare collection market, the challenges agencies and operators are facing, and gain an understanding of where the fare collection industry is heading.

The survey had a specific focus on agencies' and operators' 'Core' Automatic Fare Collection (AFC) system (the primary back-office solution or sales channel with the highest per centage of sales) and was designed to try to understand some of the fundamental characteristics of these systems.

The pandemic provided a major impetus to deploy smart ticketing technology to ensure essential workers could continue to get to work while keeping riders and operators safe during successive lockdowns.

The pace of change in the ticketing industry is accelerating as more agencies move away from physically needing to issue tickets, to the convenience of using mobile phones and contactless EMV (cEMV) bank cards to 'tap and ride'.

More and more agencies are beginning to realise that their core AFC systems are approaching the end of their natural lifecycle.

Agencies who continue to believe that a bespoke 'Design-Build-Operate-Maintain' (DBOM) approach is the only realistic solution to delivering a next generation AFC system are in danger of spending too much time and money on a system that costs too much to deploy, maintain and update while failing to keep up with the pace of technology change.

At a time when many agencies are working hard to restore fare revenue post-pandemic, further delays in delivery of modern AFC solutions together with huge upfront costs pose an existential risk to some public transit systems.

Key Findings

The State of Fare Collection

- Most agencies are still operating Design-Build-Operate-Maintain (DBOM) AFC systems, with 37 per cent running an on-premise system and 22 per cent their own systems hosted in the cloud.

- 34 per cent of agencies have been operating their 'Core' Automatic Fare Collection (AFC) systems for over a decade and 54 per cent for over seven years.

- 30 per cent of agencies expect their current AFC system to be in place for more than a decade and 6 per cent over 30 years.

- 43 per cent of agencies and authorities found it 'hard' or 'very hard' to deploy new ticketing features and functions, meaning those systems became less able to meet customer expectations and operational demands over time.

- Only a third of agencies surveyed thought they had secured a good deal from their AFC supplier and only 15 per cent would recommend their supplier to another agency.

Fare Payment Trends

- After significant falls in ridership levels during the pandemic, 92 per cent of agencies are planning fare payment innovations to bring riders back on board.

- More than half of agencies are planning to introduce mobile ticketing.

- Just under half are planning to introduce contactless EMV (cEMV) payments using contactless bank cards and mobile phones.

- The shift to using a shared fare payments platform is gathering pace, with 42 per cent of agencies saying they will select a Fare Payments-as-a-Service (FPaaS) approach for their next AFC system upgrade and just 17 per cent sticking with bespoke systems.

Introduction

The way transit agencies and operators purchase and run ticketing (fare collection) systems has not changed significantly in decades, but the fare collection landscape has changed dramatically since we last conducted this survey in 2019.

The arrival of the pandemic plunged public transit into crisis mode. Ridership levels plummeted, creating acute financial distress for public transit systems around the world. And yet transit agencies and transport authorities still needed to guarantee essential workers continued access to safe and reliable services to enable them to get to work.

At the same time, contactless EMV (cEMV) payments and mobile ticketing rapidly moved up the fare collection agenda. The need for touch-free methods of fare collection during the ongoing pandemic elevated interest in smart ticketing and accelerated the pace of change around the world.

While the industry as a whole is still trying to figure out what the long-term future looks like, in the world of smart mobility and fare payments, the future feels like it just got a whole lot closer.

The 'Core' Automatic Fare Collection (AFC) system (the primary back-office solution or sales channel with the highest percentage of sales) used by agencies is still dominated by AFC providers offering heavily customized solutions which agencies purchase and operate for years (even decades) using a 'Design-Build-Operate-Maintain' (DBOM) model.

A DBOM approach to delivering a new ticketing system for an agency means each agency must invest considerable time and money to develop an exhaustive list of specifications, essentially designing a system from scratch in advance of every procurement.

The DBOM approach means each agency purchases its own solution to fit bespoke specifications, usually using bespoke software and hardware. In effect, this means each agency needs to 'reinvent its own wheel', rather than pooling expertise and leveraging economies of scale.

This research sought to understand the full lifecycle of such DBOM systems: how long they take to build and implement, for how long they remain in place, as well as how easy they are to update to provide passengers and agencies with new functionality.

Masabi's 'State of Fare Collection' report also attempts to gauge the transit sector's interest in new approaches to smart ticketing – such as using a shared platform enabling Fare Payments-as-a-Service (FPaaS) – and analyses emerging trends in this area along with insights into fare payment technologies that agencies are looking to implement.

Methodology

Masabi issued a survey in the late summer of 2021 to professionals working for transit agencies and operators around the globe, with a particular focus on fare collection teams. We wanted to better understand the fare collection market, the challenges agencies and operators are facing, and gain an understanding of where the fare collection industry is heading.

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The survey was completed by 59 transit professionals from 59 agencies and operators. The majority of respondents (85 per cent) were from agencies based in North America and, as the chart below shows, drawn from a cross-section of agencies and operators of all sizes.

What is the size of your agency?

Journeys per year
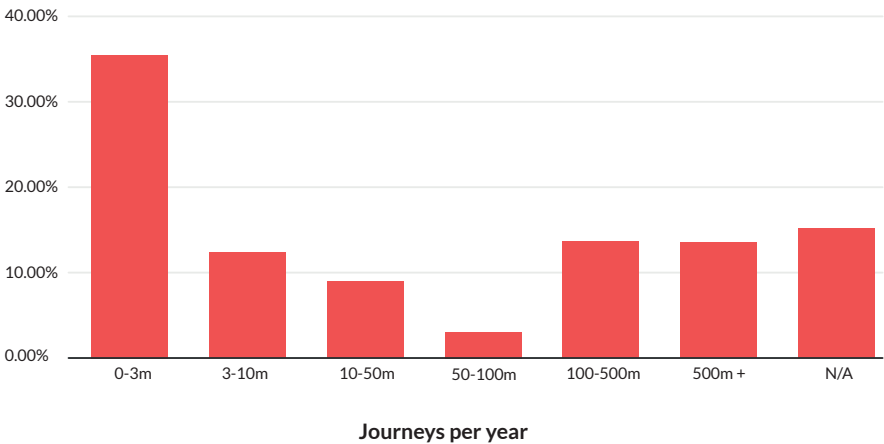
The Findings

System Infrastructure and Hosting

The first question focused on how agencies operate their systems. There are now several different ways agencies can host and run their core ticketing system which can have a significant impact on the services available to riders.

When asked: "How is your Automatic Fare Collection (AFC) system infrastructure deployed?", 37 per cent of agencies were still paying the significant costs of maintaining their own system and server infrastructure in-house. A further 22 per cent had their own bespoke systems hosted in the cloud, with 10 per cent aware it was cloud-based but unsure how it was hosted. Interestingly, 10 per cent of respondents are now using 'Cloud Native' platforms, which are shared platforms architected and hosted in the cloud.

The main advantages of Cloud Native platforms is that they do all the things you would expect from a cloud-based system, such as managing the day-to-day server infrastructure, security and industry standard upgrades required to maintain optimum performance and reliability, along with feature and functionality upgrades. However, because they are specifically designed to operate in the cloud they are able to truly scale at speed to manage extreme peaks in demand such as rush hour traffic, take full advantage of hardware-as-code and reduce costs. This leaves the transit agency free to focus on delivering the best fare collection experience for operators and riders.

AFC System Hosting Options

On-Premise.
Agency uses a bespoke system hosted on its own servers physically located at its premises.
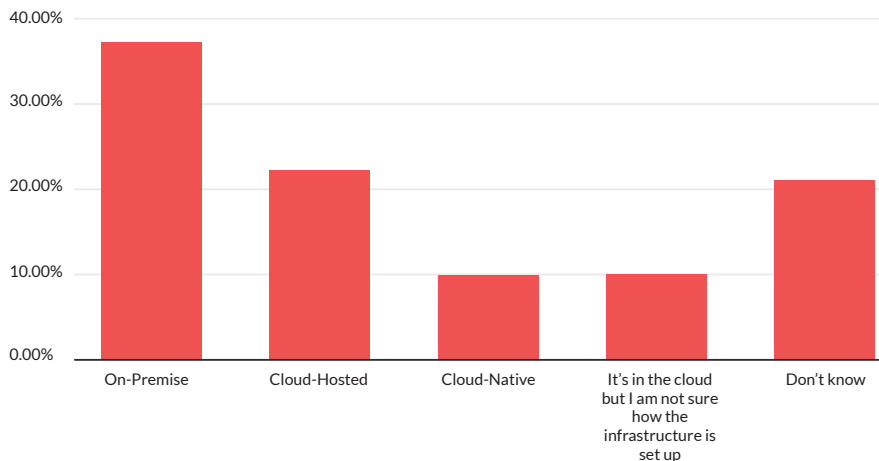
Cloud-Hosted.
Agency uses a bespoke system and server infrastructure supplied by an external AFC partner who hosts this in the cloud.

Cloud-Native.
A cloud-native service takes full advantage of cloud computing and makes extensive use of features to allow a fundamentally different type of software architecture to be delivered, with significant advantages in code maintenance, speed of development, true scalability, testability and reliability. Shared fare payment platforms should be Cloud-Native.

How is your Automatic Fare Collection (AFC) system infrastructure deployed?


Locally hosted and cloud-hosted DBOM bespoke AFC systems will always take a considerable amount of time, money, and staff resources to set up before they start providing services for passengers, with an ongoing maintenance liability to keep them functioning properly. They are also typically much more difficult to upgrade to maintain security and deliver new functionality, so these systems tend to degrade over time as it becomes almost impossible to keep on top of the updates they require.

AFC System Lifespan

Respondents were asked "How long has your 'Core' Automatic Fare Collection (AFC) system (the primary back-office solution or sales channel with the highest percentage of sales) been live?". With most agencies still running their own DBOM systems, it comes as no surprise that transit agencies typically run an AFC system for several years after initial implementation and this year, 34 per cent of those surveyed said they had been operating their system for over a decade, with a further 20 per cent saying their AFC system had been in place for 7 - 10 years.

When we last conducted this survey in 2019, 43 per cent of agencies had been running their systems for 10 years or more, with a further 13 per cent running them for 7-10 years.
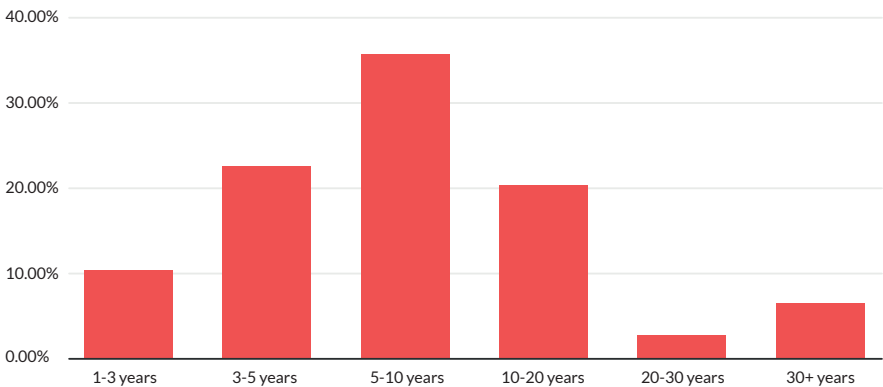
How long has your Automatic Fare Collection (AFC) system (the primary back-office solution or sales channel with the highest % of sales) been live?

2019 **2021**
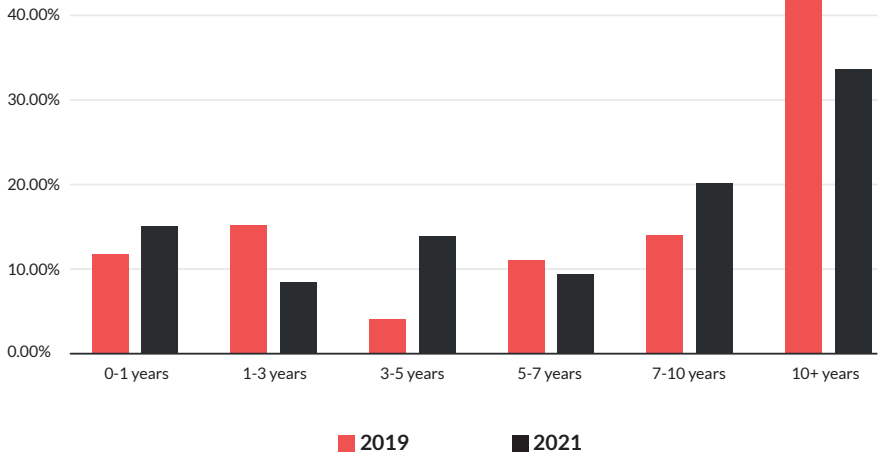
In both surveys, around a quarter of the authorities surveyed reported introducing a new AFC system within the last three years.

In order to get a complete view on how long these systems are live, we then asked "How long will your Core AFC system be in place?". An astonishing 20 per cent indicated that their AFC will run for between 10 and 20 years, 3 per cent 20 to 30 years and 7 per cent more than 30 years. It's clear that once live these systems are in place for a considerable amount of time, but how quickly do systems typically take to go live?

How long will your AFC system be in place for (estimate total length)?

Time to Market

Specifying, building and introducing a new AFC system is a lengthy process for some agencies. To dig further into this, the survey asked, "How long did your 'Core' Automatic Fare Collection (AFC) system take to get up and running from the contract award?".

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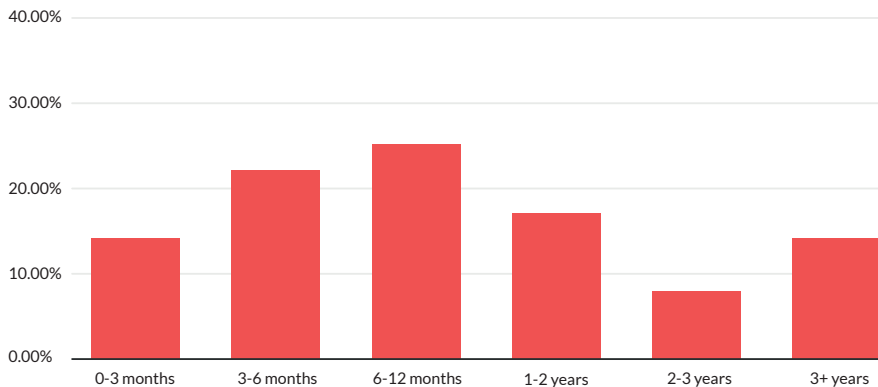
Although the responses were split fairly evenly, they roughly correlated with agency size and how the system was deployed. Smaller agencies, and those using Fare Payments-as-a-Service AFC platforms instead of DBOM systems were quicker to launch.

As most agencies are still designing and building their own systems, it comes as no real surprise that 39 per cent of agencies took over a year to go live with their systems, and 14 per cent took more than three years to fully deploy. These approaches mean that new payment innovations take a long time to get into riders' hands.

Software Upgrades & New Functionality

It's clear most systems take considerable time to deploy, and when they do, they are in place for significant periods of time. The natural next question is what happens to the system when it's in place?

To continue to offer passengers the best experience by implementing the latest advances in ticketing, payment security and user experience, agencies need the capability to regularly update their systems with new features.

Recent advances in the fintech sector mean that payments technology is constantly improving. These advances offer the opportunity to make the experience for both operators and riders much more convenient – as long as an agency's AFC system is flexible enough to incorporate them.

However, when agencies were asked about the ease of deploying new functionality, the results were less than encouraging.

Only 10 per cent of agencies said making these upgrades was 'easy' and did so every few weeks. Unsurprising, this response came exclusively from the agencies running shared AFC platforms. Another 46 per cent said it was 'medium' and they only made updates every few months. 20 per cent described the process as 'hard' – and upgrades only happened occasionally, while 24 per cent said the process was 'very hard', and updates were both rare and cost-prohibitive.

How easy would it be to deploy new ticketing features and functionality for your Automatic Fare Collection (AFC) system?
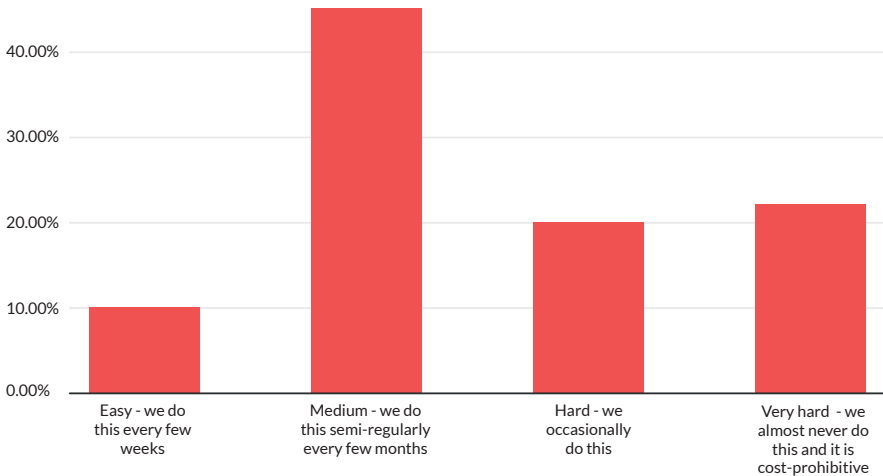
If an agency doesn't update their AFC system on a regular basis, the system degrades over time relative to the pace of changing technology. Both riders and agencies lose out in this scenario, as passengers are not able to use the newest features in the industry (or – in the case of the oldest systems – features that are no longer new, but industry-standard elsewhere), and agency staff may struggle with outdated software to administer their system.

It's worth noting that the respondents who described deploying new functionality as 'Easy' were using a 'Fare Payments-as-a-Service platform' for their AFC infrastructure.

In a world where SaaS solutions are the norm, relying on systems which hardly ever improve or upgrade cannot be a viable choice and will leave the industry struggling to keep up with rider expectations.

Investment

Even when an agency realises that its AFC system needs to be replaced as more and more aspects of the system become redundant or unsupported, the upfront costs of scoping, commissioning and implementing a new system are often too high to justify.

When answering the question "Did your 'Core' Automatic Fare Collection (AFC) system require an upfront investment?" only 8 per cent replied "Nothing Upfront" which came from respondents using a shared platform.

Upfront costs for other respondents ranged from $100,000 to $1 billion, with a quarter of the respondents spending in excess of $1 million.

**Did your Automatic Fare Collection (AFC) system require an upfront investment?**
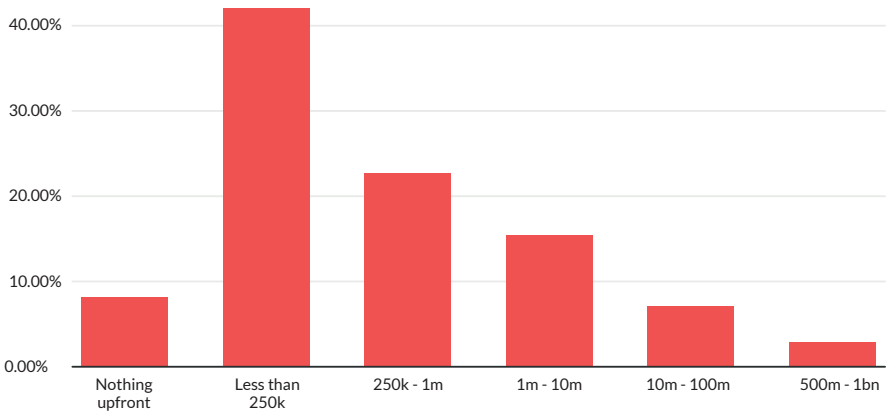
Often (especially in North America) these new systems are so cost-prohibitive for medium and smaller sized agencies that they are only able to invest in a new fare collection system with a grant provided by the federal government. A FPaaS approach will free more agencies to be able to deliver new systems without the need for grant funding, helping more riders receive the latest fare payment innovations.

Vendor Sentiment

Asked whether they believed they received good value for money from their AFC supplier, only 30 per cent confirmed they had. A worrying 42 per cent of agencies said they weren't sure, while a further 27 per cent concluded that they had not got a good deal from their vendor.

**Do you think your agency has received value for money?**
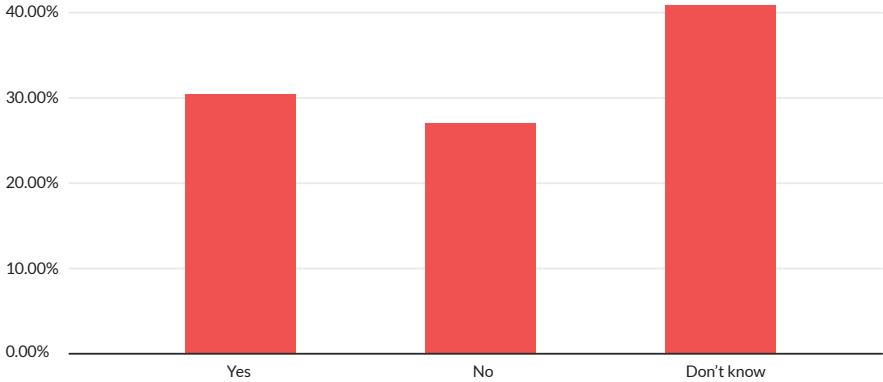
When breaking the answers down and correlating the data with agencies who knew how their system was delivered, the results varied considerably. 67 per cent of agencies using Cloud-Native platforms believed they received value for money, compared to only 31 per cent of agencies running DBOM systems. An astounding 35 per cent of agencies running DBOM systems felt they had not secured value for money.

Do you think your agency has received value for money?	Yes	No	Don't know
DBOM Systems - On-Premise and Cloud Hosted	31.43%	34.29%	34.28%
FPaaS platforms - Cloud-Native	66.67%	00.00%	33.33%

We then asked agencies: "Would you recommend the company you used to other agencies?". The overall number of agencies who said they would recommend their fare collection supplier is extremely low at just 15 per cent.

Would you recommend the company you used to other agencies?
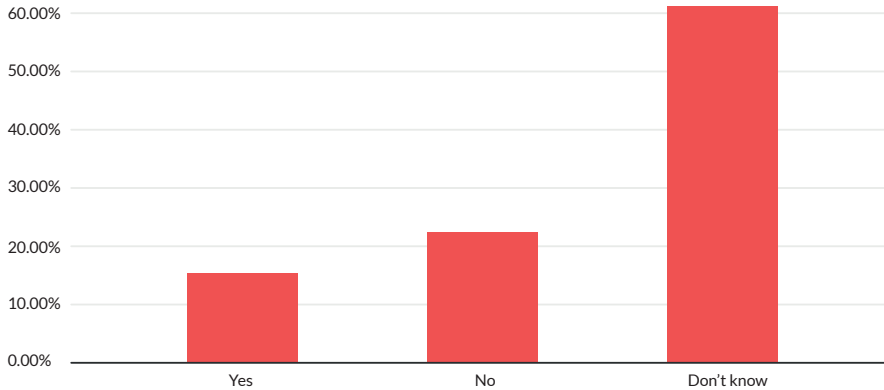
Again, when digging a little deeper, the results vary dramatically depending on how the system is delivered, with 67 per cent of agencies using Cloud-Native platforms saying they would recommend their supplier to other agencies, compared to just 14 per cent using bespoke systems. There is also a stark difference between detractors.

Would you recommend the company you used to other agencies?	Yes	No	Don't know
DBOM Systems - On-Premise and Cloud Hosted	14.29%	28.57%	57.14%
FPaaS platforms - Cloud-Native	67%	0%	33%

The status quo in fare collection tends to leave many transit agencies trapped using a system which is cost-prohibitive to replace and which, platform users aside, they are not satisfied with. In the meantime, agencies are left with deteriorating technology, and are unable to implement new passenger-convenience features that can incentivise riders to return to transit post-pandemic.

Fortunately, there is a way out of this tailspin.

The Future of Fare Payments

So, where are transit agencies headed when it comes to maximising convenience and offering useful new functionality to encourage riders back post-pandemic? It's interesting to note that 92 per cent of agencies are planning fare payment innovations to bring riders back.

Our survey revealed that the hottest topics preoccupying transit agencies at the moment are Account-Based Ticketing and Fare Payments-as-a-Service (FPaaS).

Account-Based Ticketing is a ticketless way of allowing people to travel, meaning riders simply tap or scan using a secure token (usually a contactless bank card, smartcard or mobile device), linked to an account in the back office, to make a journey. The number of taps and location of these taps calculates the fare, which is charged to the passenger post-tap (or post-journey). This means riders do not need to buy a ticket or understand fares and can benefit from best fare policies.

Please tell us about your fare payment plans to help get ridership numbers back up to pre-pandemic levels. (check all that apply)	% of total
MaaS app offering (with journey planning)	32.20%
Account-Based Ticketing (ABT)	35.59%
Contactless EMV (cEMV)	49.15%
Mobile Ticketing	55.93%
Retail cash top up	35.59%
Remove cash onboard vehicles	15.25%

Over a third of our survey respondents said they were planning to introduce Account-Based Ticketing and more than half said they were planning to introduce mobile ticketing.

Several other emerging trends are also of note. Amongst North American agencies, there is strong interest in using contactless EMV (cEMV) payments. Agencies are also moving towards retail store cash support for unbanked riders, a feature that accelerated during the pandemic and aligns with the trend to take cash off buses in North America.

Why Account-Based Ticketing?

Account-Based Ticketing takes on a key role in deploying contactless EMV. If done correctly, contactless EMV should run using an Account-Based Ticketing back office. cEMV just operates in a different way to other tokens (like smartcards and mobile barcodes) which use a 'Stored Value' account to do the same thing. It is important to note that agencies can create equity and support all rider groups if they include other payment tokens such as smartcards and mobile barcodes in addition to a contactless EMV ticketing experience.

FPaaS or Bespoke for your next system?

Finally we asked respondents whether they would adopt bespoke or Fare Payments-as-a-Service approaches next time they upgraded their AFC system. Perhaps most revealingly, of the 59 agencies surveyed, only 17 per cent said they planned to continue to implement bespoke fare collection systems. Meanwhile, 42 per cent said they would move to a FPaaS model for their next system or were in the process of migrating. A further 41 per cent were still researching the options. These responses strongly suggest that the trend towards platform-based AFC solutions and away from bespoke systems is gaining momentum.

Conclusion

The pandemic provided a major impetus to deploy smart ticketing technology to ensure essential workers could continue to get to work while keeping drivers and staff safe during successive lockdowns.

Now, the challenge for transit agencies is to restore the fare revenues required to sustain their services by making ticket purchases as simple as possible for all riders – including those who don't have credit cards or smartphones.

The pace of change in the ticketing industry is accelerating as more agencies move away from physically needing to issue tickets, to the convenience of using mobile phones and contactless EMV payments.

The future of ticketing is not about tickets: it's about fares and payments using an account-based back office. Furthermore, with an account-based approach, agencies can extend services to seamlessly connect public and private transit options to enable full first/last mile journeys.

More and more agencies are beginning to realise that their core AFC systems are approaching the end of their natural lifecycle.

Agencies who continue to believe that a DBOM approach is the only realistic solution to delivering a next generation AFC system are in danger of spending too much time and money on a system that costs too much to deploy, maintain and update while failing to keep up with the pace of technology change.

At a time when many operators are working hard to restore fare revenue post-pandemic, further delays in delivery of modern AFC solutions together with huge upfront costs pose an existential risk to some public transit systems.

Fortunately, there is an alternative which can deliver the future-proof, user-friendly fare payment technology needed to tempt riders back onto public transit without huge upfront costs and long lead-in times for deployment.

Fare Payments-as-a-Service offers a better approach to underserved agencies wanting to provide fare payment services for passengers. Instead of needing to run a DBOM project, agencies and operators can sign up to a Fare Payments-as-a-Service platform and pay for services on a pay as you go/subscription basis.

This enables agencies to deliver the latest 'tap and ride' innovations to riders extremely quickly and grow capabilities – such as contactless EMV payments – as they get released onto the platform.

Fare Payments-as-a-Service also has the potential to drive greater operational efficiencies associated with taking cash payments off the buses while delivering genuinely equitable fare structures for all riders.

About Masabi

At Masabi, we're bringing the Fare Payments-as-a-Service revolution to transit agencies around the world.

We believe the costs of designing, building and operating a bespoke AFC system are too high and unnecessary. That's why we operate on financial models which enable transit agencies to introduce responsive new fare payment systems funded by a small per centage of ticket transactions, incentivising usage of the system with low upfront costs.

We are able to do this because we operate a single shared platform meaning we can share the costs between all the agencies on the platform.

We're currently delivering affordable smart ticketing and fare payment solutions for riders at more than 100 transit authorities worldwide.

Join us for the ride?

Hop on board at **www.masabi.com**

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