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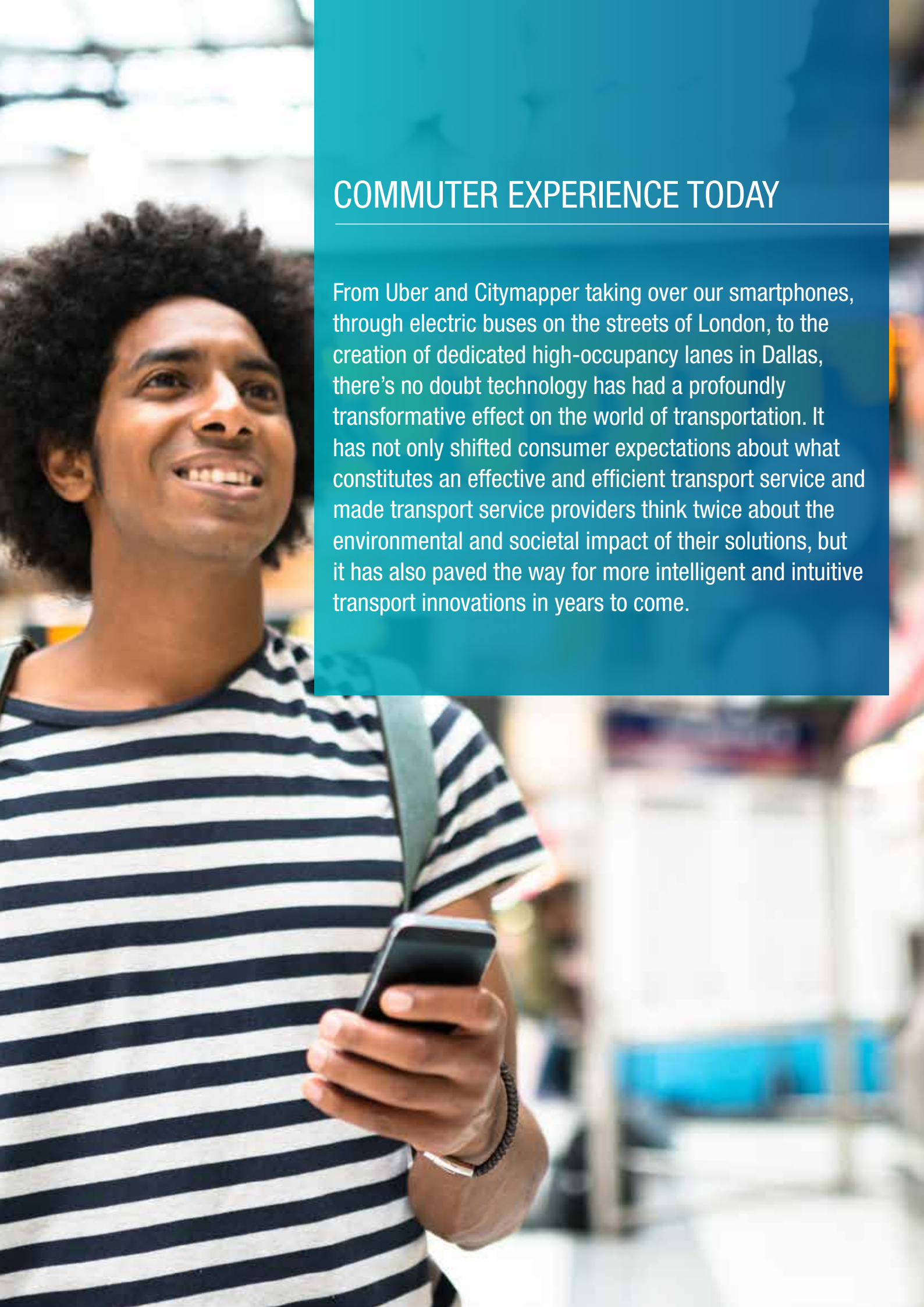
The Future of Stations
Transforming Virtual Ticketing

COMMUTER EXPERIENCE TODAY

From Uber and Citymapper taking over our smartphones, through electric buses on the streets of London, to the creation of dedicated high-occupancy lanes in Dallas, there's no doubt technology has had a profoundly transformative effect on the world of transportation. It has not only shifted consumer expectations about what constitutes an effective and efficient transport service and made transport service providers think twice about the environmental and societal impact of their solutions, but it has also paved the way for more intelligent and intuitive transport innovations in years to come.

GROWING DEMAND

The growing demand for personalized transport offerings and a trend towards collaborative consumption has led to a boom in alternative transport solutions, dominated by companies like Google, Apple and Uber. The growth of on-demand transport and a shift away from car ownership, driven in part by better consumer awareness, gave commuters greater flexibility and unprecedented choice of transport options. It has also, rather unintentionally, put a strain on already struggling public transport infrastructure.

CONGESTED STATIONS

Many cities around the globe are straining under ballooning numbers of passengers, leading to congestion, pollution, and unhappy commuters. According to the Office for National Statistics in the UK, "commuters have lower life satisfaction, a lower sense that their daily activities are worthwhile, lower levels of happiness, and higher anxiety on average than non-commuters". A quick look at the figures reveals why. In London alone, the equivalent of a Tube train full of people arrives in the city every week and needs to be accommodated on the transport network. In Chicago, due to growing congestion, commuters spend an average of 60 hours, a full working week, stuck in traffic every year. In Australia, total passenger travel in cities has grown almost ten-fold over the last 70 years.

All of this has had a significant impact on stations. A large proportion of congestion concentrates on stations and around ticket machines – particularly during rush hours. In many urban areas, relatively dense housing is clustered close to transit stations, adding additional strain. As more people opt for a combination of public/private and shared transport, stations have become major connecting and drop off hubs.

And there is one more challenge to consider – an impending arrival of automation. Trials of autonomous Ubers in Pittsburgh are just the beginning, the growth of automation and artificial intelligence raises questions about the need for human employment in a much greater number of roles – hitting hard those working in and around stations. Academics from Oxford University claim 47% of US jobs could disappear within the next decade, while the Bank of England goes as far as to say risk of job loss in sales and customer service occupations, many of which include station staff, stands at 75%.

STATION TRANSITION

So what does all of this mean for the future of transport and the future of stations? Cubic believes stations can remain relevant as part of this technological revolution by becoming intelligent transportation hubs – a natural extension of our smartphones, offering intuitive transit choices and smart recommendations to commuters. Even better, Cubic believes they have an opportunity to become inspiring, multifunctional and sustainable spaces. For this to happen, however, one thing is certain – transport operators around the world will need to adjust the way they serve customers. Making smart decisions around virtual ticketing will play a major part in this transformation.

[1] The Guardian 'Commuting makes you 'unhappy and anxious', says ONS'

[2] INRIX 2015 Traffic Scorecard http://inrix.com/scorecard/key-findings-us/

[3] Department of Infrastructure and Regional Development (AU) https://bitre.gov.au/publications/2015/files/is_074.pdf

[4] The Future of Employment: How Susceptible are Jobs to Computerisation? http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf

[5] Robots Threaten 15m UK Jobs, says Bank of England Chief Economist https://www.theguardian.com/business/2015/nov/12/robots-threaten-low-paid-jobs-says-bank-of-england-chief-economist

ONE CLICK, MANY PROBLEMS

The pressure on transport service providers to limit congestion on stations and on different modes of transport and to cut down queues, has led many operators to spend considerable sums on virtual ticketing. Southeastern, one of UK's main train operators, has invested nearly £2m to ensure every railway station on their network has a ticket vending machine (TVM).

Alongside the development of ticketing technology, ticket buying habits are also changing, with passengers increasingly relying on online sales channels, especially when it comes to advance tickets. And while many commuters buying tickets on the day of travel are likely to use ticket offices (57%), purchases from TVMs have been growing slowly but steadily – from a quarter of all ticket purchases in 2010, to just under a third of all tickets purchased on the day of travel in 2014 in the UK.

Although in many countries TVMs are now competing with traditional ticket offices, the transition towards automation has not gone smoothly. The inability to serve complex transactions, long waiting times caused by difficulties in using the machines, as well

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as controversies around uncompetitive ticket fares offered by TVMs have somewhat eroded consumer trust in automated ticketing machines. What's more, union concerns around staffing and industrial action against planned redundancies and closing of ticket desks have set the transport automation debate firmly in the public consciousness and put even greater pressure on transport service providers to offer consumers – and staff, more efficient and workable solutions. We will look at each of those challenges in turn, to examine its implications for the future of virtual ticketing.

The arrival of TVMs has also marked a subtle shift in the way transport services are consumed. Commuters have taken on much of the burden of finding value offers, booking and paying for journeys. While some appreciate the new-found freedom to compare offers in the search of the best deals, less digitally-savvy travelers can often feel overwhelmed and let down by transport operators who do not provide the perceived appropriate levels of customer service.

Sales Channels on the Day of Travel

- 11% On the Train
- 32% Ticket Machine
- 57% At a Station Ticket Office

SOURCE: NRPS
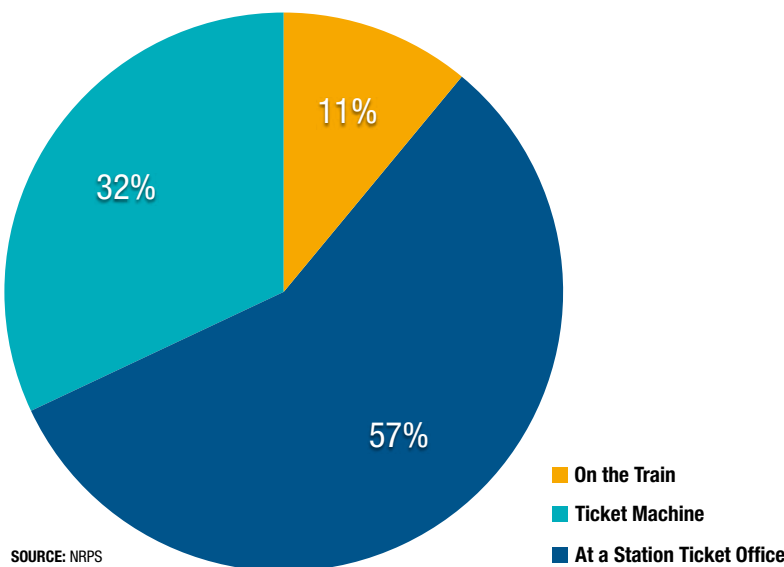
6 Time-saving machines prove just the ticket at 31 stations http://www.southeasternrailway.co.uk/about-us/media-centre/press-releases/time-saving-machines-prove-just-the-ticket-at-31-stations/
7 Rail Passenger Experience Report http://orr.gov.uk/__data/assets/pdf_file/0003/11748/rail-passenger-experience-report.pdf

THE WAITING GAME

One of the key arguments for replacing ticket offices with TVMs was the need to cut queue times and help with congestion. Section 4.12 and 4.33 of a policy document set out by the Strategic Rail Authority in the UK outline that as a rule, passengers should not have to queue for tickets for more than five minutes at peak times and three minutes off-peak.

The graph on the right, based on a study by Passenger Focus, illustrates that TVMs can indeed cut down waiting times – when compared to staffed ticket offices they can be up to 40% more efficient.

Percentage of Queues Longer than 3 Mins Off-Peak, 5 Mins On-Peak

■ Ticket Office Queues   ■ Ticket Machine Queues
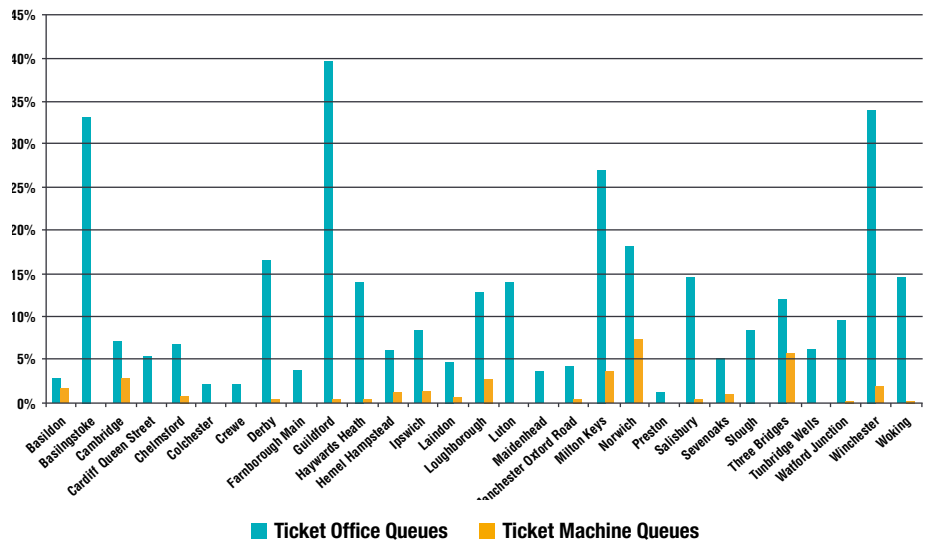
However, the key prerequisite for success is that they need to function correctly. Lack of personnel on stations means that if anything goes wrong and there is a technical issue, commuters are left unable to use machines. When a transport ticketing agency in Europe in a bid to save money and provide commuters with a better service, reduced the number of ticket offices at stations and replaced them with TVMs last year, chaos ensued. A report by Transport Salaried Staffs' Association, looked into waiting times for passengers wanting to buy a ticket from a ticketing machine and placed a number of the City's underground stations on a list of transport "black spots". Those were the stations where passengers often queued for half an hour or more to reach the ticket machine, with some ending up spending more time in line to buy a ticket than actually traveling on the underground. Importantly, the list also included stations that welcome large numbers of foreign visitors who might not be familiar with how the local TVMs work.

The media often reports on other transport horror stories: ticket machines breaking, leaving people stranded at unmanned stations in the middle of nowhere, or of problems with accepting payments leading to major delays and overcrowding. Madeleine Clare Elish, a cultural anthropologist and researcher, believes current thinking around automation tends to isolate technology away from the social conditions of its use and production, thus making it an easy target. That is certainly the case for the transport industry – technology gets the blame for turning what is already a stressful commute for many people into a complete nightmare.

8 Strategic Rail Authority https://www.ircas.co.uk/docs/SRA%20-%20Penalty%20Fare%20Policy%202002.pdf
9 Ticket Vending Machine Usability Qualitative Research http://www.transportfocus.org.uk/research-publications/publications/ticket-vending-machine-usability-qualitative-research/
10 London Evening Standard, http://www.standard.co.uk/news/transport/tube-stations-where-people-have-to-wait-for-up-to-an-hour-just-to-buy-a-ticket-a3111656.html
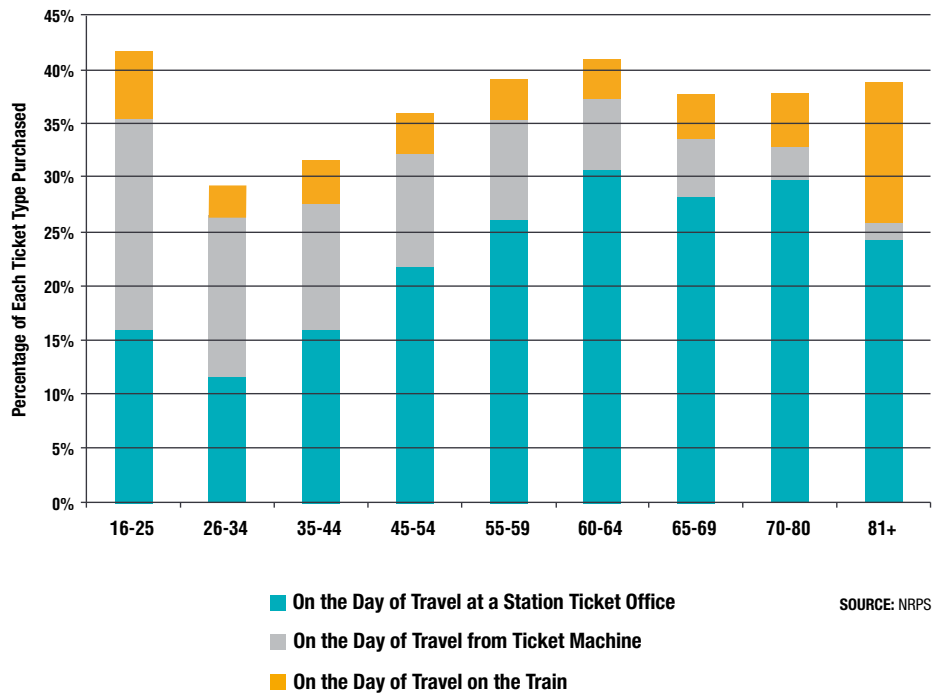
THE PROBLEM OF CONFIDENCE

Although generally seen in a positive light by industry leaders, technology can be, in fact, a serious barrier for many commuters. As such, consumer confidence is an important factor when it comes to making ticket purchases at TVMs. Unfortunately, the majority of today's electronic ticketing solutions offer a service that is far from intuitive. Even regular users of TVMs can have difficulty finding the correct and cheapest fare for an unfamiliar route. Research from Passenger Focus into the usability of ticket vending machines found that non-usage was attributable not to lack of awareness, but to concerns regarding ease of use. Many passengers who choose a ticket office over a TVM do so because they lack the confidence in their ability to select the right ticket at the appropriate price.

Purchasing Tickets on the Day by Sales Channel and Age

SOURCE: NRPS

■ On the Day of Travel at a Station Ticket Office
■ On the Day of Travel from Ticket Machine
■ On the Day of Travel on the Train

This should come as little surprise. The Office of Rail and Road study found that jargon is rife at Britain's rail stations and many people do not understand the terminology used by ticket machines. Since there is no one on hand to explain it to them, commuters purchase wrong tickets, end up overspending or they abandon the purchase altogether and choose to travel without a valid ticket.

This problem stems partially from operators trying to make TVMs quick to use while at the same time ensuring passengers are being offered a comprehensive range of fares – a difficult balance to strike, especially for more complicated journeys where multiple discounts may apply.

Age is also an important factor when it comes to confidence – older passengers much prefer the ability to speak to another human being when making their purchase. When it comes to buying tickets on the day of travel, 16-25 year olds are most likely

to use a ticket machine, while the use of TVMs after the age of 60 falls dramatically, a factor that might explain why 71% of travelers are against full automation. Disabled or visually impaired passengers might also prefer human contact, rather than dealing with a machine that may or may not cater to their needs.

It is clear that while investing in innovative technology is an attractive proposition for the digitally native commuters, technology itself cannot be an answer. Transport service providers have an obligation to offer a service that can be used by the public as a whole, which means, in reality, they can only move at the pace of their least digitally-savvy customers.

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11 The Guardian https://www.theguardian.com/uk-news/2016/jun/02/train-ticket-machines-need-clearer-language-jargon-study

12 London Evening Standard, http://www.standard.co.uk/news/transport/hundreds-of-tube-ticket-offices-to-shut-as-machines-replace-staff-8883895.html

THE HUMAN FACTOR

As the march of automated technology continues through stations, it can be easy to underplay the importance of the human factor in commuters' interaction with TVMs. Passengers want to purchase tickets easily and travel for the best price – something many do not feel ticket machines are able to guarantee. Having the option to speak to another human being gives commuters confidence that they have purchased the best deal.

An investigation by the Daily Telegraph into British ticket machines, found that TVMs regularly offer uncompetitive pricing. Whether this comes down to people's inability to use the machines in the correct way, or the way ticket options are programmed into TVMs, the investigation found discrepancies of more than £100 pounds per journey, when compared with tickets bought elsewhere at the station. The Daily Telegraph also uncovered that some ticket machines deliberately promote more expensive fares, while burying more affordable and discounted prices. That is particularly destructive to the reputation of TVMs, as research shows commuters generally trust online sources of information – and expect that to translate to ticket machines at stations.

The complexity of fare structure is a common criticism faced by transport service providers and signals a wider industry problem. Large numbers of tickets available and poor transparency when it comes to ticket restrictions, mean people often perceive fares as bewilderingly complex. When faced with a TVM that lacks intuitive prompts or appropriate guidance that would enable passengers to make the best purchase, buying tickets can be a frustrating experience.

It is the responsibility of operators to ensure passengers are provided with enough information to make a purchase at the best available price. Nevertheless, the controversies around ticket prices offered by self-service machines have cut down commuters' trust in the technology and have done little to help operators encourage a move away from manned ticket offices, in the hope of deploying staff in more business critical roles.

In addition, as demand continues to rise, operators realize that simply processing transactions is not enough to provide best-in-class service. In order to make a difference to customers and offer a viable alternative to manned ticket desks, TVMs need to be able to support less common transactions, such as low-value

refunds, set discount entitlements, resolve incomplete journeys or replace lost or stolen travel cards – something manned ticket offices have no problem dealing with, but something not many of the machines can currently support.

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CUBIC'S ANSWER –
THE BEST OF BOTH WORLDS

Cubic is determined to focus on continually innovating existing solutions to address evolving challenges – and that includes taking another look at virtual ticketing solutions. By applying existing and emerging technologies in imaginative ways, Cubic can help operators meet budget cuts and the entire transport network infrastructure handle the growing demand.

Cubic's solution of choice to the issues discussed in this whitepaper is a virtual ticket office, Cubic Virtual Ticket Agent. The Cubic solution is a perfect example of innovative technology that marries convenience with efficiency, while at the same time easing congestion and improving mobility services for citizens. It aims to provide passengers with the benefit of a walk-up ticket office that can connect them via a live video-link to a local ticketing expert. It can use the built-in camera for document validation and share information with passengers to help them select the right ticket and journey options. By relying on video, Cubic Virtual Ticket Agent offers an easier way to display information such as maps, time tables, when the next train will arrive, etc. all during a conversation that the customer service agent has with the consumer. Agents can also speak multiple languages, which means they can deal with tourist queries without any communication issues.

Offering all the functionality of a regular ticket office, but using a video link instead of an on-site operator, Cubic Virtual Ticket Agent addresses all of the issues of a traditional TVM. The average duration of a query via the Cubic product is just under a minute, meaning that technically the virtual ticket office can cope with 60 or more transactions an hour. It also enables station staff to be deployed around stations, keeping human contact in public transit in a more efficient and effective way and improving staff visibility at platforms.

An alternative solution involves machines that focus on the journey and the person, rather than tickets. An example is the Cubic Kiosk, which models human cognitive processes to intuitively guide passengers through the ticket search process. Similarly to Cubic Virtual Ticket Agent, every Kiosk includes live video assistance when the passenger needs it.

Those two solutions signal the arrival of the next generation of TVMs – machines that are intelligent but do not outsmart the passenger, intuitive and easy to use but also transparent, and always a step away from real human interaction. That is exactly what stations of the future will need.

CUBIC VIRTUAL TICKET AGENT IS A PERFECT EXAMPLE OF INNOVATIVE TECH THAT MARRIES CONVENIENCE WITH EFFICIENCY, WHILE AT THE SAME TIME EASING CONGESTION AND IMPROVING MOBILITY SERVICES FOR CITIZENS.

CONCLUSIONS

According to some estimates, the traditional ticket office will continue to fulfill as much as 30% of all ticket sales in the near future. The remaining 70% is up for grabs. The pace of technology will only increase and the pressures on public transport infrastructure are here to stay, so it is crucial transport operators remain ahead of the game. Cubic believes automating some services and introducing technologically innovative solutions at stations is the way forward but can only be successful when it comes with a full understanding of the social and behavioural patterns of transport's biggest stakeholders – commuters themselves. Only then will stations stop featuring in the public consciousness as unwelcoming, purely functional locations, and start playing a wider, civic role in this increasingly urbanized world. Cubic is looking forward to helping transport operators embrace this exciting challenge.

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CUBIC – A LEADER IN INTELLIGENT TRAVEL SOLUTIONS

At Cubic, we believe our identity is intrinsically linked with our customers, and the people our customers serve. How they get from one place to the next – how that impacts their lives, their fellow travelers and their cities – and how it feels along the way.

That's why we're passionate about developing transportation solutions that improve the way we move throughout cities. Innovation is in our culture, and our history speaks for itself. In our 45-year history, we've delivered public transport fare collection systems to over 450 operators, including 20 regional back office systems, and traffic and transportation management systems for major cities on four continents.

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