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Abertis Mobility Services

DRIVING TOLLING INSIGHTS

Beyond Collection: Rethinking Revenue Assurance

Miguel Melchor, Growth, Market Development & Public Affairs at Emovis, explores how smart enforcement and revenue assurance are reshaping the future of toll-based mobility.

INTRODUCTION

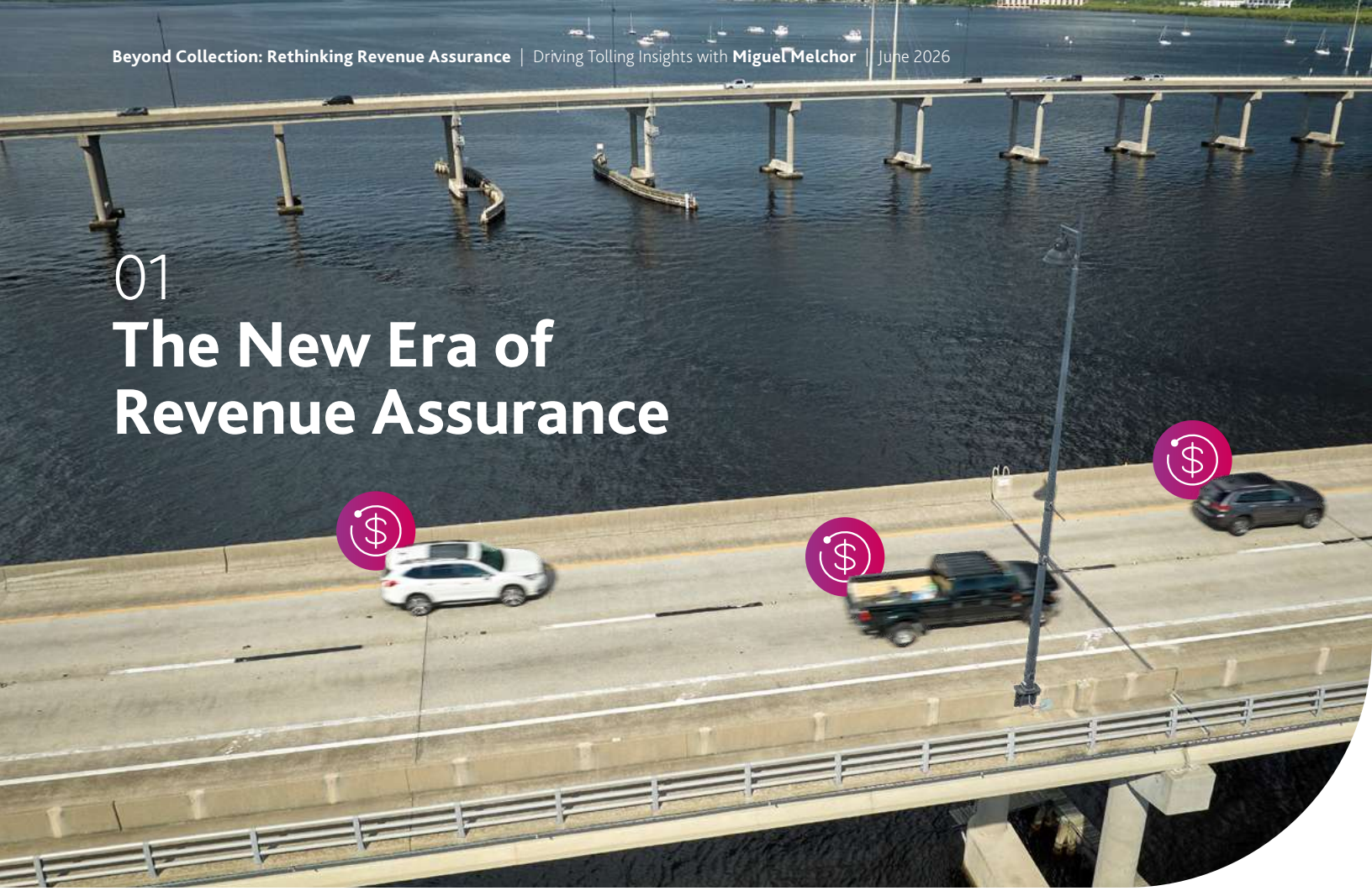
As tolling systems continue to evolve toward all-electronic and free-flow operations, protecting revenue has become far more complex than simply collecting payments. Across the United States alone, an estimated $2.24 billion in toll revenue goes uncollected each year, highlighting the structural challenges that modern tolling systems must overcome.

Today, transportation agencies are navigating increasing transaction volumes, changing driver behaviors, interoperability requirements, fraud risks, and growing public expectations around fairness and transparency. In this new environment, Revenue Assurance is no longer just an operational function—it has become a strategic capability that combines advanced data analytics, artificial intelligence, operational intelligence, and customer-centric enforcement to ensure that every legitimate transaction is accurately captured, validated, and recovered.

In this edition of *Driving Tolling Insights*, **Miguel Melchor**, Growth, Market Development & Public Affairs at Emovis, explores how smart enforcement and revenue assurance are reshaping the future of toll-based mobility, helping agencies protect revenue while building more intelligent, efficient, and trusted transportation ecosystems.

$2.24 billion

in toll revenue goes uncollected each year in the United States.



01

The New Era of Revenue Assurance

Revenue Assurance has become one of the defining topics in tolling today. Why is it evolving from an operational function into a strategic priority for agencies and operators?

Miguel Melchor: Revenue Assurance in the U.S. tolling sector is increasingly being repositioned as a strategic lever rather than a purely operational control function. This shift is driven by the material scale of revenue exposure—where systemic leakage across the transaction lifecycle represents a significant impact on agency financial performance and funding capacity.

The transition to all-electronic, barrier-free tolling models has fundamentally changed the revenue realization model, moving it from point-of-collection certainty to a multi-step, data-dependent process spanning identification, billing, and payment.

In this context, Revenue Assurance is evolving into an enterprise-wide capability focused on end-to-end governance, data integrity, and optimization of collection efficiency. It now plays a critical role in supporting long-term financial sustainability, improving customer outcomes, and enabling more resilient, digitally driven tolling operations.

What are the biggest sources of revenue leakage that industry leaders should be paying attention to today?

MM: One of the first areas where revenue leakage can occur is in the roadside equipment (RSE), either because vehicles are not detected or because the transactions cannot be billed due to a missing or incomplete license plate image. To address this, Emovis not only uses certified equipment, but also applies its fingerprint technology, which allows to uniquely identify a vehicle even when the plate is missing or only partially visible. By recognizing the characteristics that make a vehicle unique, the system can distinguish it from another vehicle of the same make and model. If that vehicle passes through the same toll point multiple times and the plate is not captured on one occasion, the system can use its fingerprint to match it to the correct license plate.

In the back-office environment, another important source of leakage occurs when the vehicle has been identified and the owner is identified for invoicing, but the address is missing or out of date, making invoice delivery impossible. In these cases, external stakeholders such as DMVs also play a critical role. To reduce this type of leakage, we recommend using external data sources to verify mailing addresses whenever a recipient cannot be reached, helping to avoid repeated mailings to the same incorrect address and reducing the operation costs.

Finally, the largest source of leakage comes from users who do not pay the tolls, either because they are unaware that payment is required or because they deliberately choose not to pay. This is also the area where the greatest progress has been made in recent years, as more effective tools are now available to identify these users and increase payment rates.

At Emovis, we encourage agencies to implement measures that improve compliance—that is, make it easier for users to pay within the voluntary payment period. Examples include offering early payment discounts, enabling toll account access and invoice payment through a mobile app, or introducing account types such as toll-by-plate, where users can register using only their license plate number.

TOP 3 CAUSES OF REVENUE LEAKAGE

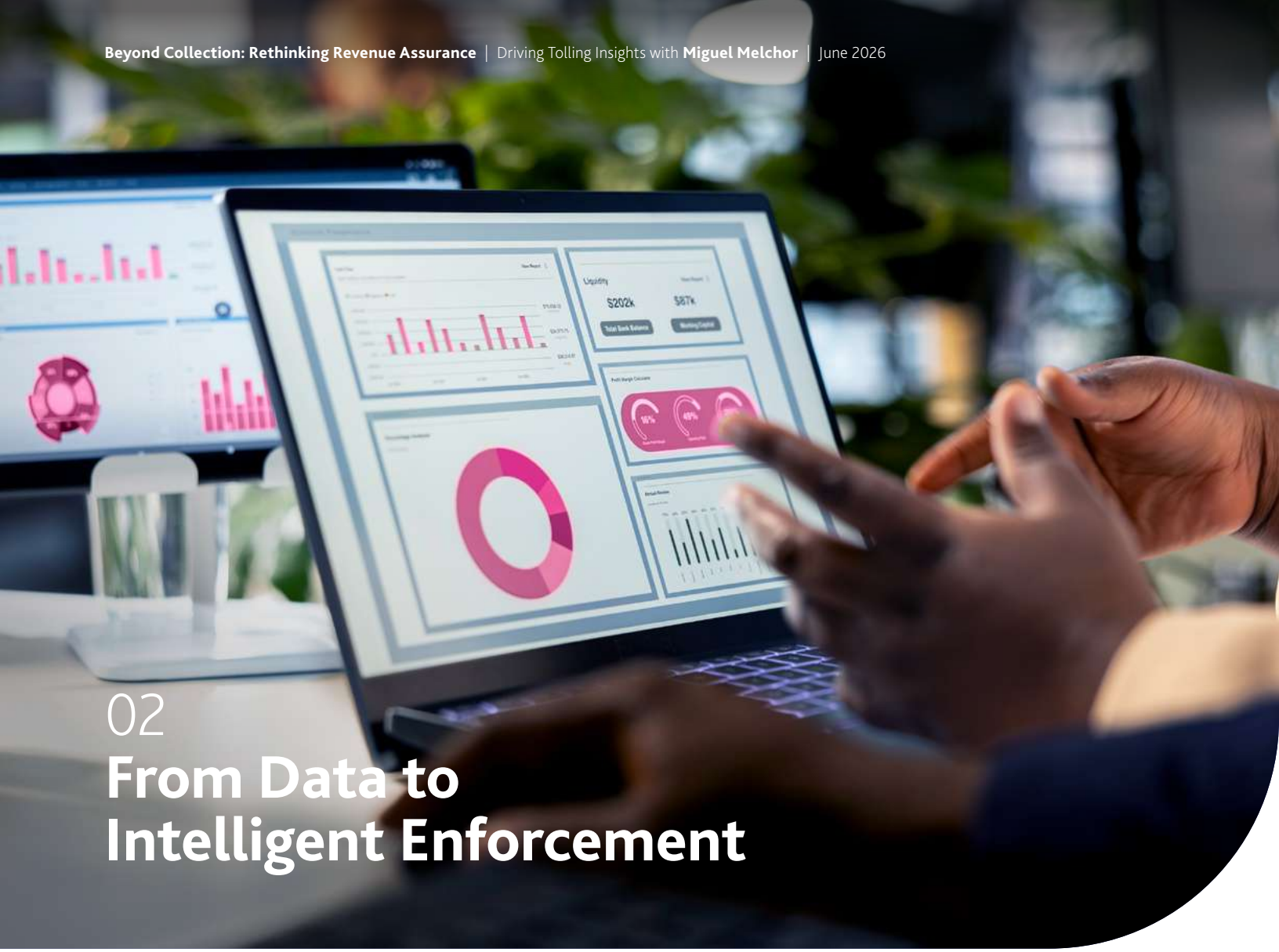
1. Vehicle is not detected or transaction cannot be billed due to a missing or incomplete license plate image
2. Vehicle has been identified and the owner is identified for invoicing, but the address is missing or out of date
3. Users who do not pay the tolls, either because they are unaware that payment is required or because they deliberately choose not to pay

How has the expansion of free-flow tolling increased both the opportunities and the complexity of protecting revenue?

MM: The expansion of free-flow tolling has been a major step forward for the transportation industry. It has made driving seamless by automating toll payments and removing the need for drivers to stop their vehicles at toll booths to pay, while improving road safety by reducing the number of accidents near toll plazas, lowering fuel consumption by eliminating stop-and-go traffic in payment queues, and improving traffic flow by reducing travel times.

However, it also creates a challenge when it comes to revenue protection. Since there is no physical barrier, vehicles pass through first and pay afterwards, which means payment is no longer guaranteed. This introduces a risk that did not exist before.

As a result, agencies and operators have had to develop systems that protect revenue while maintaining service quality and positive user experience. Here is where we find an opportunity to build a revenue assurance model with cutting-edge technology that allows us to see, in detail, where the main issues are and design the solutions to tackle them.



02

From Data to Intelligent Enforcement

How are artificial intelligence and advanced analytics changing the way agencies approach enforcement?

MM: The emergence of artificial intelligence has given us a valuable tool to improve the way we analyze information and support better decision-making.

Emovis uses advanced analytics to develop algorithms and data models that help predict customer payment behavior, improve the collection process, reduce the likelihood of unpaid invoices, and optimize debt recovery.

This results not only in lower revenue leakage, but also in reduced operating costs and improved system reliability, ultimately leading to better service.

How is predictive intelligence changing the way agencies think about revenue protection?

MM: A few years ago, when users did not pay their toll invoices, we would only act once the payment had already been missed. The approach was also largely the same for all users, with little consideration given to factors such as the invoice amount or whether the user was a frequent or occasional customer.

Thanks to predictive algorithms, we can now go a step further and take action much earlier. This involves analyzing factors such as the invoice amount, the number of transactions on the invoice, toll usage patterns (whether the user is occasional or frequent), the customer's payment history on previous invoices, and even external data such as the sociodemographic and economic profile of the area where the user lives, as well as the time of year when the invoice is issued.

All this information combined and powered by advanced analytics results in assigning to each invoice a payment score that indicates the "likelihood of payment" and is used to support better decision-making, such as assigning different criteria based on specific ranges and enabling resources to be used more efficiently and helping reduce operating costs.

However, the predictive model is only the first stage. It is complemented by a prescriptive model that recommends actions to optimize debt collection. This means identifying the most effective way to contact the user—including best time of day, the most suitable contact method (phone call, email, letter, etc.), and even whether offering an installment plan could help facilitate payment.

The combination of predictive and prescriptive models not only reduces operating costs and improves system reliability, but also significantly increases revenue collection and improves the user's overall perception of the system.

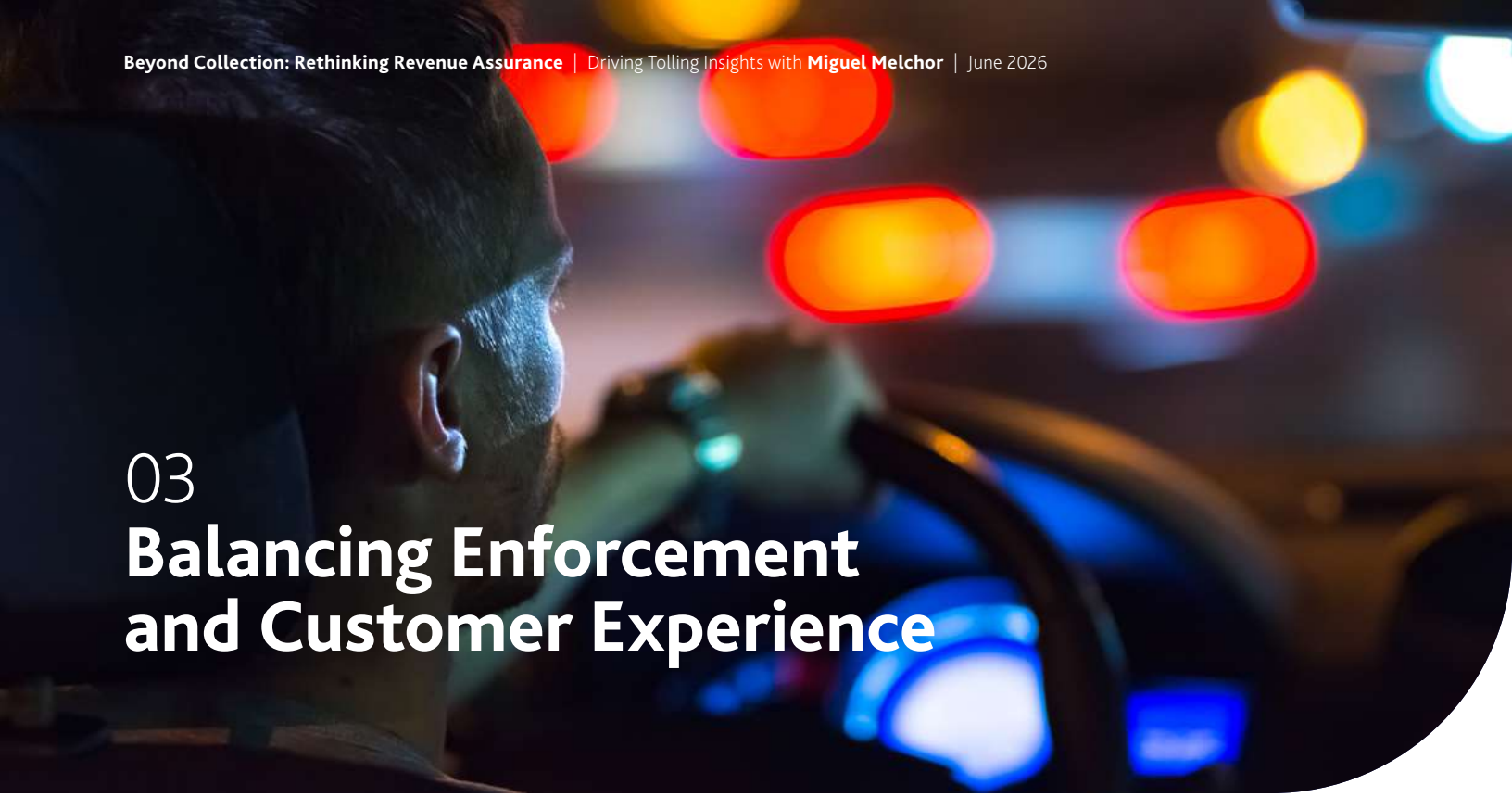
What role does data integration across roadside systems, back-office platforms, and customer channels play in building a stronger Revenue Assurance strategy?

MM: To identify the main sources of revenue leakage, it is essential to analyze the entire project value chain, from the moment a vehicle passes through a tolling point to the debt collection stage, since no two projects are the same—and neither are the roads or the behavior of the users who travel on them.

At Emovis, we always recommend starting with an audit of each system component—roadside, back office, and operations—to identify where leakage is occurring, analyze those issues, determine their root causes, and design tailored solutions to address them.

Thanks to data integration, we can view these components as part of a single, connected system rather than as separate elements. This allows us to understand how actions taken in one area impact others, assess whether the measures implemented are delivering results, and take further action when needed.

Analyzing the entire project value chain, from the moment a vehicle passes through a tolling point to the debt collection stage



03
Balancing Enforcement and Customer Experience

How is the industry moving from reactive collections to proactive customer engagement?

MM: Based on Emovis's experience across contracts in both the United States and Europe, many users fail to pay tolls simply because they are unaware that payment is required, do not know how to pay, or forget to do so.

As a result, a user who is initially willing to pay the toll may become reluctant to do so because of a poor customer experience.

One way to address this challenge is to shift from a reactive model to a proactive approach to customer engagement. This can include continuously running information and awareness campaigns to ensure that all users receive clear information about toll rates, payment methods, and payment deadlines. It is also important to recognize that every day there are new drivers who may not be familiar with this information, and that while some users will naturally prefer digital payment methods, others will continue to prefer manual options—which must also remain available.

For drivers who do not pay on time or are unwilling to pay, it is important not only to identify them and pursue payment, but also to provide them with a proper way of communication and flexible payment mechanisms or alternatives that make it easier for them to resolve the outstanding balance.

How can personalized communications, digital payment options, and omnichannel engagement improve voluntary compliance?

MM: To deliver a more seamless customer experience, Emovis has developed AI-based tools that allow us to build user profiles, engage more effectively with customers, and make interactions easier.

In today's era of mass communication, it is essential to understand not only what we communicate, but also how and when we communicate it. This is where the prescriptive algorithms we mentioned earlier become key. We are now able to determine what message to send, at what moment, and through which channel to achieve better results without creating a negative perception among users.

Digital payment methods are a major advantage when it comes to increasing compliance, as they allow users to make payments anytime and from anywhere. Emovis has extensive experience in developing these types of apps, enabling drivers to pay toll invoices or penalties without needing to create an account, or through an account that automates payment by linking it to a credit card to prevent deadlines from being missed, or simply by sending a push notification to remind the user of an outstanding payment.

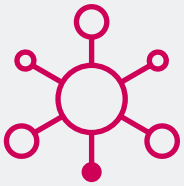
In an omnichannel environment, one of the biggest frustrations for drivers arises when they want to file a claim for a charge they do not recognize or believe to be incorrect, and they do not know where to turn. To address this, Emovis has developed an AI-based tool called Smart Penalty Advisor. When a user contacts our call center and indicates that they want to file a claim, the tool automatically provides step-by-step support to guide them through the process, gathering all the information needed to open the case and, whenever possible, resolve it.

PERSONALIZED COMMUNICATION

Identifying what message to send, at what moment, and through which channel

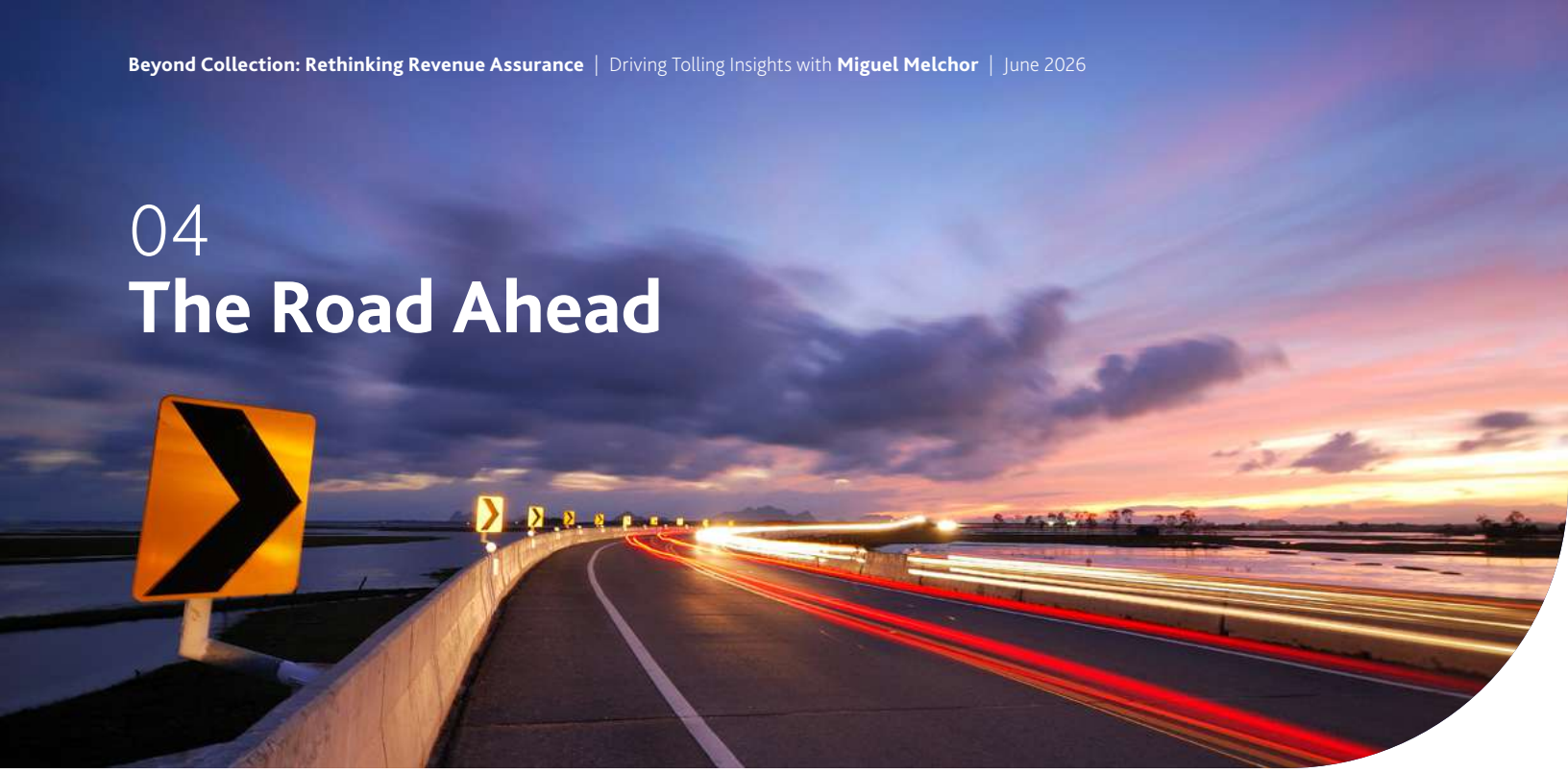
DIGITAL PAYMENT METHODS

Enabling a smooth and easy payment experience that increases compliance



OMNICHANNEL ENGAGEMENT

Providing AI-based, step-by-step claim support to ease user frustration



04 The Road Ahead

Q **Looking ahead, what will distinguish agencies with world-class Revenue Assurance capabilities from those still relying on traditional collection models?**

A **MM:** There are two factors that will make the difference.

The first one is how agencies choose to tackle the problem. Revenue leakage will not fix itself unless action is taken. Traditional collection models have proven they can help mitigate the issue, but in the long run, they are more expensive to operate, are less reliable, and they don't allow for detailed tracking of the effectiveness of improvement initiatives. In contrast, the new models rely on cutting-edge technology, enabling them to process larger volumes of information and parameters simultaneously, which makes them more cost-effective and reliable as they are highly automated and self-learning.

The second factor is how this is perceived by road users. Traditional methods focus on recovering debt, not the customers. The new models take a more customer-centric approach, aimed at making payment easier without being intrusive. This creates better customer experience, which in turn leads to better payment compliance.

As a result, we will see agencies that gradually reduce leakage and could reinvest those savings into improvements that make the system more robust and reliable, while others will need to allocate increasing resources just to maintain their results.

If you could give transportation leaders one piece of advice to start their Revenue Assurance transformation today, what would it be?

MM: A revenue assurance transformation is not a sprint—it's a marathon. It's a process where solutions are implemented gradually and their results continuously analyzed. This means the required investment can be adjusted to each agency's needs, making the journey much more manageable.

As a first step, I would recommend conducting a full analysis of the entire value chain to identify where leakage is occurring and quantify it. I'm certain many agencies will be surprised when they see the results.

After that, an action plan should be developed outlining the initiatives and creating an implementation roadmap, giving priority to those that will have the greatest impact and those that can be deployed quickly. This makes it possible to understand the resources required.

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