ACMA CURRENCY NOTES

June 2022 Volume 5 | Issue 4

IN THIS ISSUE

Keeping Cash Relevant as a Method of Payment **1**

Effective Decision-making for Efficient Cash Supply Chain Operations **3**

Combatting Till Fraud in the APAC Region Using AI **7**

Members' Newsboard - Latest Stories from ACMA Members **10**

KEEPING CASH RELEVANT AS A METHOD OF PAYMENT

DAVID FAGLEMAN | ENRYO

It can be easy to think that in a globalised world everyone is enjoying the same experiences and replicating the same behaviour. The reality is that while there are millions of people living in a very similar way to you, there are many more experiencing a very different version of 2022. And when we consider that every country, and every region within a country, is different, even similar behaviour will have its own characteristics country-to-country.

Cash - banknotes and coins - is the oldest and most recognisble form of payment.

Payment behaviour is a good example of this. The use of non-cash payment methods for daily transactions is part of a greater trend towards digitalisation; from banking to retail, communication to education, digital is impacting many areas of our daily lives. However, while the world is better connected in many ways than ever before, there remain idiosyncrasies that run deep in a nation's culture, producing a payments DNA unique to each country.

Cash, defined as banknotes and coins, has a number of functions that makes it a unique commodity. It is the oldest and most recognisable form of payment that, over the course of millennia, has enabled communities, nations, cultures and empires to thrive. It has, in many ways, been the constant over the course of known human history.

It is because of this influence and longevity that cash plays a number of roles in modern society and is discussed in several ways. It is a currency, providing

..... *Continued on next page*

Continued from previous page ·····

a system of money for countries, issued by the central bank, that is often discussed in terms of the amount of it in circulation. It is also used as a store of value, an asset, held on to by people and investors with a view that it will maintain value, particularly in turbulent times. More recently, as a direct result of the increasing role of digital technology in daily and essential services, cash is viewed as the 'contingency method of payment' that can, in the short-term, keep high street payments functioning in the event of an emergency e.g. a power outage or cyber-attack on the digital payment system.

Arguably, the original role of cash is that as a payment method to facilitate transactions between consumers and merchants. Its ability to do this over millennia has made it the successful payment instrument that we know today. Cash is the original instant payment and every technological advancement, whether it be cheque, card or digital has attempted to replicate, and in some cases improve, its characteristics of being a quick, easy and safe way to transact.

The growth of high-speed internet access and digital capability, combined with the proliferation of smartphones and merchant adoption of non-cash payment options, is placing Asia on a journey towards greater adoption of digital payments. The fusion of pandemic-induced hyper-awareness of health and safety, as well the introduction of state-sponsored and payment industry-led digital person-to-person and person-to-business payment platforms, could result in cash being displaced as the payment method of choice for some over the next 5-10 years. This trend could evolve into the rapid transition of the Asian payments landscape in a way similar to that experienced in Scandinavian and some Western European countries.

However, all economies require a "certain" level of available cash to function and with that comes the realisation that cash is essential for the inclusion and independence of many citizens, particularly the vulnerable, and the success of Asia's thriving small business community. Governments and central banks need to understand that cash is a critical resource with no substitute that fully meets the needs of consumers, regulators and businesses.

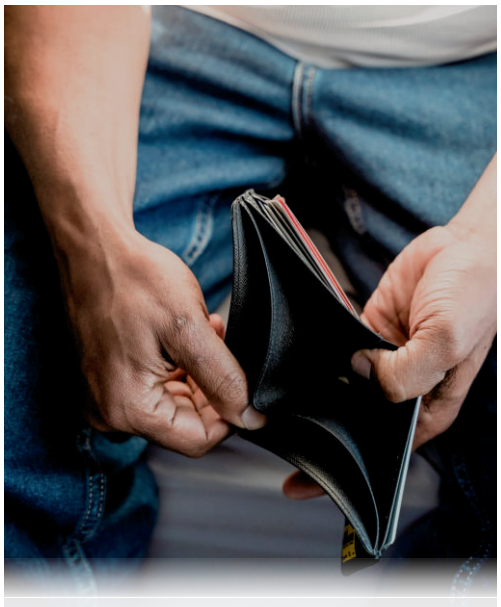
Over the past few months, we have been working with the ACMA to produce a report that investigates the role that cash plays in Asia countries, as well as the risks posed by the unchecked growth of digital payments to businesses and consumers. For example, not all digital payment methods offer the same level of security as cash and many have opened the door to new methods of crime and privacy concerns, providing more information than the transaction itself. There is also a growing level of risk to consumer safety due to a rise in e-commerce and the prevalence of online scams and crypto investments, as well as a risk to consumer well-being with the removal of the self-limiting nature of cash resulting in people overspending and potentially falling into unhealthy debt.

The report makes the case for why cash is essential to a well-functioning economy and altruistic society, and provides information

····· *Continued on next page*

> "CASH IS THE ORIGINAL INSTANT PAYMENT AND EVERY TECHNOLOGICAL ADVANCEMENT, WHETHER IT BE CHEQUE, CARD, OR DIGITAL HAS ATTEMPTED TO REPLICATE, AND IN SOME CASES IMPROVE, ITS CHARACTERISTICS OF BEING A QUICK, EASY, AND SAFE WAY TO TRANSACT."

Adoption of non-cash in Asia has been accelerated by the boom in high speed internet access and digital capability across the region.



Cash is inherently self-limiting, which prevents overspending and debt.

Continued from previous page ·····

and guidance on areas that can support the cash industry during this time of change. The 21st century has provided consumers and merchants with more ways to pay than at any other time in human history. It's vital that cash remains relevant in order to offer citizens of the world a safe and trusted way to transact in any circumstance.

The report concludes with several recommendations for what central banks and governments can do to support cash and we urge the ACMA membership to take these to the respective authorities and request implementation. The report also includes recommendations for the cash industry, as it's important not to stand still in times of change. Work needs to be done to ensure that cash competes with new innovations in the payments landscape and continues to fulfil its role as a method of payment. At the upcoming Asia Cash Cycle Seminar (ICCOS Asia) in Manila 5-7 September, the report will be presented, followed by a panel discussion by the key players from the various sectors of the industry.

With more ways to pay today than ever before, it is vital that cash remains a safe and trusted option.

EFFECTIVE DECISION-MAKING FOR CASH SUPPLY CHAIN OPERATIONS

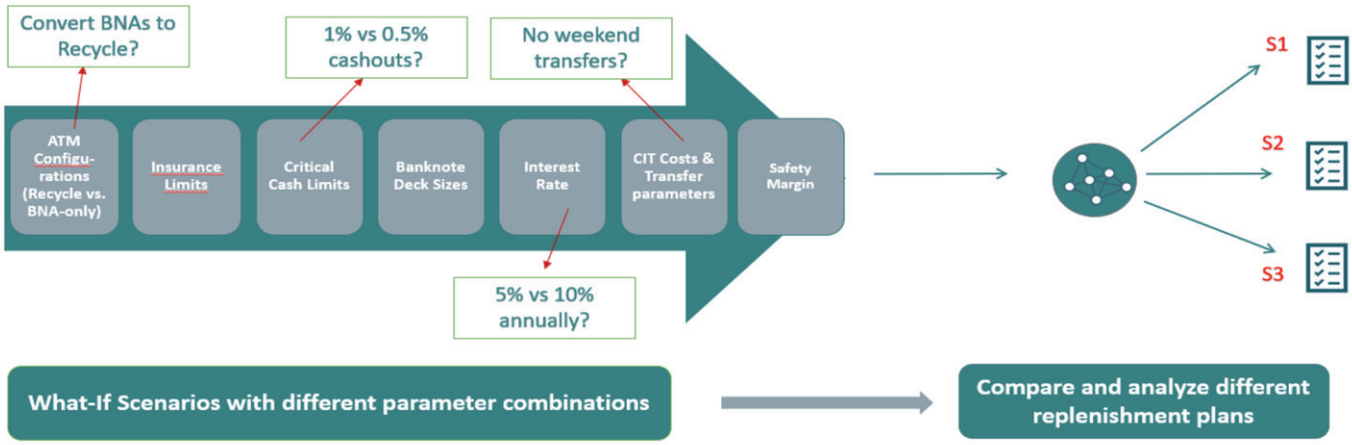
MEHMET ARIKKAN | ARUTE SOLUTIONS

Producing daily replenishment plans for a large cash point network is an integral part of the daily operation of the Cash Supply Chain for the related organization. Having optimal replenishment plans, those that are the result of Machine Learning and Mathematical Optimization, are becoming the new norm for managing large cashpoint networks. Software solutions ease the pain of unexpected cashouts, manual planning, and idle cash accumulation while minimizing cash replenishment costs.

These systems however do not always answer the following questions for more effective planning of the cash supply chain:

- CIT Amounts: Can the operation support more CIT or should we outsource some CIT for optimal planning? If so, how much CIT do we need for better planning and price negotiation?
- CIT Resources: Based on the CIT costs, how many resources should the CIT operation be carried out? Do we need more/fewer vehicles or people?
- Balance Reduction: If the cost of cash increases due to interest rates, how much balance should we decrease for minimizing cost?
- ATM Configuration: What is the ideal

····· *Continued on next page*



Continued from previous page ·····

cassette configuration for the ATM network to achieve the lowest cost (recycle more, replenish less)?

To answer these types of questions, a "Simulation" methodology can be utilized whereby changing the parameters of the entire system or individual/group of cashpoints, the effects of different scenarios for better decision making can be studied and compared.

The same engine that can produce optimal replenishment plans can be used with some modifications to produce and compare different plans for the changing parameter sets. These results can then be used for an effective data-driven decision-making process to improve the daily cash operation.

As an example, consider the following results which assesses different scenarios for an effective replenishment days strategy. A CMC currently replenishes the ATMs every day and is trying to assess whether it is financially better to make no replenishments to the ATM network on the weekend or at least no replenishments for Sunday as the CIT costs on the weekend are higher and the CMC needs to employ extra resources for the weekend operation as well. However, this scenario is also subject to the constraints:

- No more than 8500 CITs per day
- No more than 600M TRY total replenishment amount per day

are allowed since these numbers are not achievable with the current CIT contracts.

The Simulation engine simulated the No Weekend and No Sunday replenishment options and produced the following results for the CMC for their 1377 ATMs and 3 months total operation:

Weekdays	All Days Replenishments		No Weekend Replenishments		No Sunday Replenishments	
	# of CITs	Repl. Amount	# of CITs	Repl. Amount	# of CITs	Repl. Amount
Mon	7392	465,620,000	8747	404,795,000	7868	482,495,000
Tue	7493	502,870,000	6334	379,835,000	7292	481,305,000
Wed	8218	573,155,000	8263	579,370,000	8257	568,435,000
Thu	6482	573,385,000	5715	418,175,000	6454	567,465,000
Fri	5389	484,280,000	8801	870,230,000	5368	481,990,000
Sat	8463	594,230,000	0	-	8363	588,045,000
Sun	1378	104,590,000	0	-	0	-
Total	44815	3,298,130,000	37860	2,652,405,000	43602	3,169,735,000

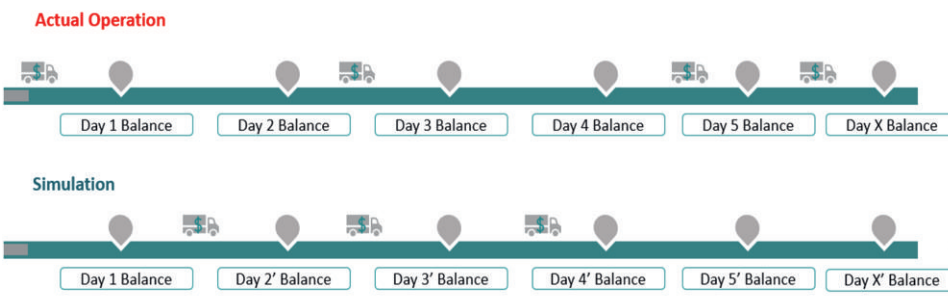
The results with the red markup indicate that for "No Weekend" replenishments, both the CIT limit and the replenishment amount constraints could not be met. This was due to the fact that in the case of No Weekend replenishment, the Friday replenishment had to account for the whole weekend withdrawals as well as the Monday ones until Monday CIT delivers the cash. The second option of No Sunday replenishments seemed to provide slightly fewer CITs and replenishment amounts and the fact that only one day of extra personnel was required for the weekend proved to be the best option. As a consequence of these Simulation results, the CMC switched to No Sunday Replenishments strategy which was a major change in their operation.

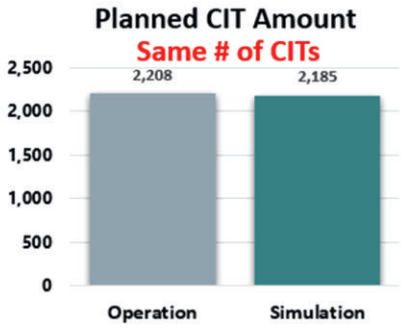
The Simulation is very important in another sense such that it also showed the CMC that if in the future they wanted to switch to No Weekend replenishments, the CIT contract had to account for the higher numbers. So it can also be used as a planning and contract negotiation tool as well.

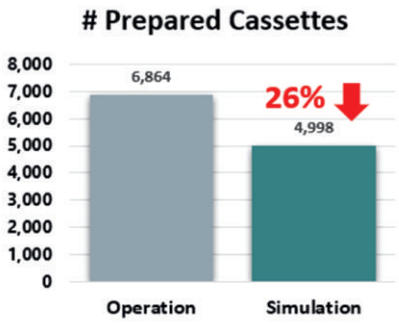
Simulation can also be used as a Proof-of-Concept (PoC) tool for a new CMC for cash optimization, to observe how much savings can be introduced to the network. After getting historical data from the CMC, a timeframe in the past (typically one month) is selected, and the Simulation is put into operation. It produces its own plans and advances balances by applying its plans, and at the end, the results of Simulation plans vs CMC's actual operation are compared to determine how would cash optimization operate for this network.

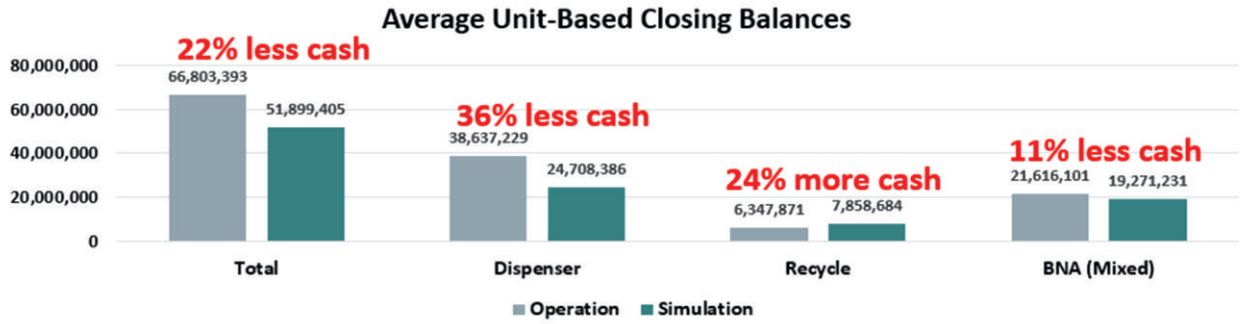
Using this methodology, we can clearly see how much can be saved, how would the costs differ and how much CIT should be made, etc. The parameters can also be tuned as per CMC's request. For example, when we first run the initial Simulation, the system produced 1.5 time more CIT than the actual operation with a huge gain in daily balances; however, when the CMC told us that they could not increase the CIT numbers due to

····· *Continued on next page*









Continued from previous page .....

operational constraints, by introducing additional costs on the backend, the Simulation engine was able to produce as much CIT as the CMC's operation:

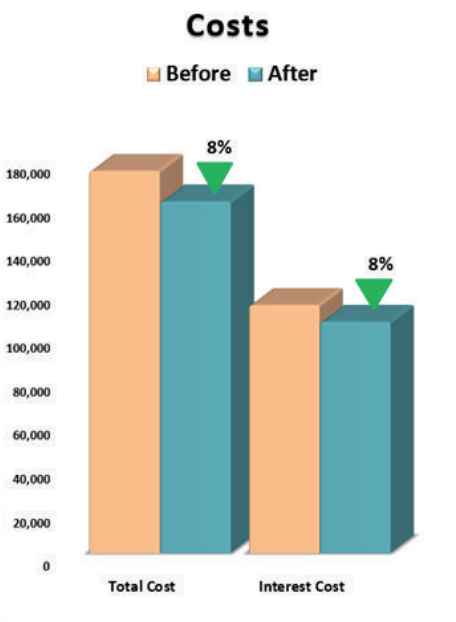
Even with the same number of CITs, Cash Optimization software simulation was able to manage this ATM network with 22% less cash balance! This meant that these plans as compared to actual operation:

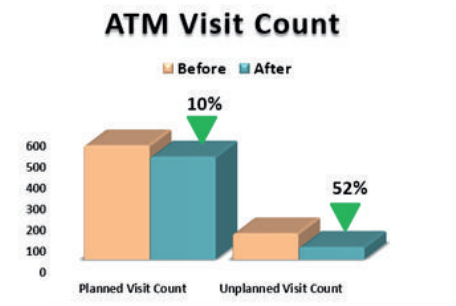
- Recycled more cash in the recycle units
- Replenished less to dispenser units but enough
- Collected more cash from BNA/mixed units

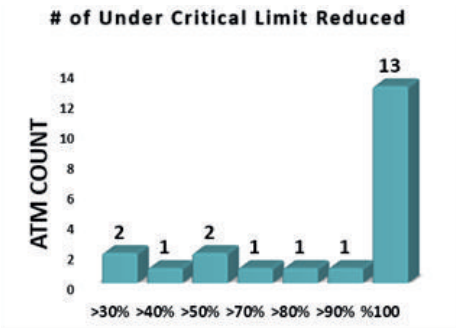
So using Simulation, an insight on how and by how much the cash management can be improved can clearly be identified to aid in the decision-making process.

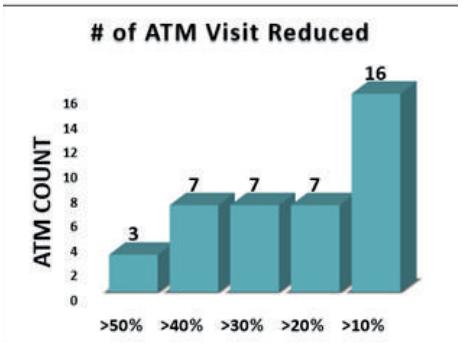
For another example, ATM configurational changes were studied. For 40 ATMs that had 200 TRY Recycle cassettes, the scenario for changing these cassettes to 20 TRY Recycle was studied and the results were compared:

Should this change be made?









Certainly, as by changing to 20 TRY Recycle cassettes:

- Costs are 8% less
- Planned visit counts would be 10% less, unplanned 52% less
- A lot more cash (almost 2.5 times) would be recycled
- Half of the ATMs would not fall below critical cash levels anymore

The Simulation engine is powerful enough, that not only for Cash planning but also for CIT Routing planning it can

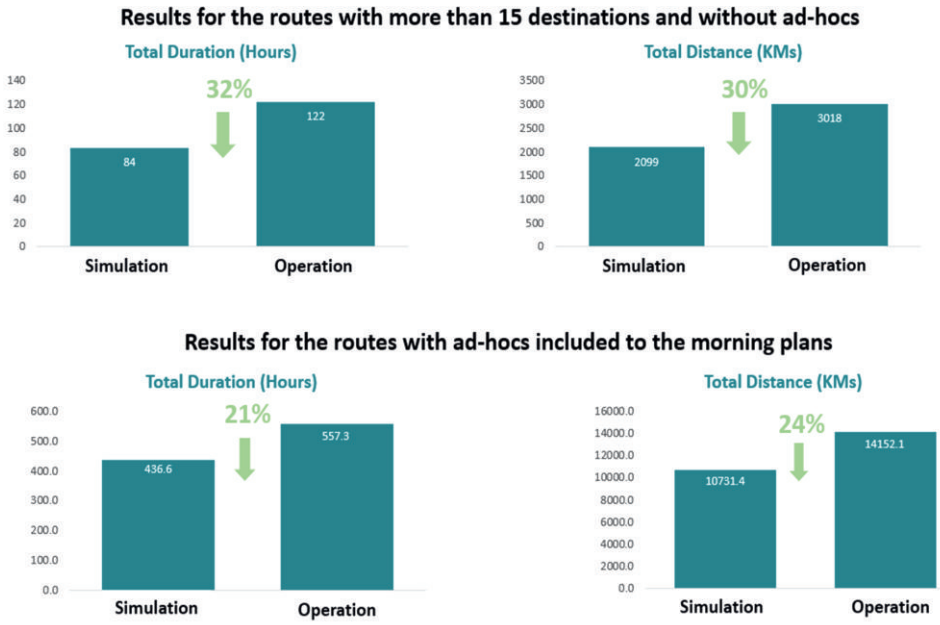
..... *Continued on next page*

Continued from previous page ·····

be used to infer if any gains are possible. In another example of its usage, CIT Routing simulation was run to see if Routing Optimization for CITs can indeed make a difference from the actual operation:

The Simulation by the routes it created proved that even with adhocs introduced in the daily operation, it was able to save more than 20% for distance and duration of the total travel for the CIT for a given region. Without adhocs and with the routes serving large numbers of cashpoints, the benefit is even higher and can grow by more than 30%.

In conclusion, planning the cash cycle operation can prove to introduce great benefits and it provides the necessary data for hard-to-make, operation-changing decisions. Together with optimization, Simulation is yet another powerful tool in the cash planner's toolset to make sure that the most effective cash cycle processes are in place for the organization.



Enryo

Intelligent solutions in times of change

An independent consultancy designed to support the financial services industry as it navigates times of change. We offer support and guidance by providing agile and innovative solutions to:

Research & education
Stakeholder & political engagement
Risk & resilience planning
and more.

enryo.org
info@enryo.org

UPCOMING EVENTS

ATMIA Asia Conference 2022: Next Gen Asian ATMs
27-28 July 2022
Singapore

Asia Cash Cycle Seminar 2022
5-7 September 2022
Manila. The Philippines

COMBATTING TILL FRAUD IN THE APAC REGION USING AI

DR MARK EARTHEY | MATRICA

Introduction

The APAC region is not immune from the global rise in retail shrinkage of all types. Fortunately, Point-of-sale till-fraud is one area of shrinkage where POS data can be collected and rapidly used to effectively detect the fraud, and even prevent it.

In Part 1 of this article, we reviewed the APAC region's established methods for fighting till-fraud, commented upon their shortcomings, and noted that traditional techniques for combatting till-fraud are becoming less effective against increasingly sophisticated fraudsters. We concluded that APAC retailers need a new approach.

In Part 2, we'll focus on this new approach, which involves the advanced analysis of POS and related data using pattern-recognition technology, incorporating Artificial Intelligence (AI) and Machine Learning (ML). Indeed, we believe that fighting till-fraud using this new technology is the best way forward for Loss Prevention (LP) in the APAC region.

In this article, AI refers to the capability of a computer system to mimic or replicate key aspects of human intelligent behaviour. ML is what gives computer systems the ability to progressively improve their performance on a specific task, or "learn," without being explicitly programmed to do so.

The new approach

Although modern tills create huge amounts of POS data, direct evidence of till-fraud can be very difficult for LP staff to extract. Furthermore, sophisticated cases of till-fraud may be so deeply buried in the POS data that they remain virtually invisible unless the retailer is prepared to invest disproportionate amounts of analytical resources. The main benefit of an AI/ML-led approach is that it enables the rapid, automated, and cost-effective detection of till-fraud across huge quantities of complex transaction data, including the cases near-invisible to humans.

Fortunately, there is a finite number of till-fraud variants that criminals can use, so whichever they choose to employ, they will always leave a trace in the POS data. That trace is vulnerable to detection by AI and ML LP technologies using pattern-recognition.

The use of ML in combatting till-fraud involves the application of two types of models for pattern-recognition :

1. A supervised model, or one trained on wide-coverage, properly labelled POS data sets that exemplify different types of till-fraud. Each transaction is classified as either a specific type or 'exemplar' of fraud or classified as non-fraud. The model is trained to recognise fraudulent transactions based on the set of exemplars. The model reviews new POS data against the exemplars and flags any matches to LP staff.
2. An unsupervised model, or one trained using unlabelled data and without pre-defined exemplars. These models detect anomalies by identifying individual transactions that do not conform to the majority in terms of certain characteristics in, or properties of, those it has identified

Continued on next page

> "THE MAIN BENEFIT OF AN AI/ML-LED APPROACH IS THAT IT ENABLES THE RAPID, AUTOMATED, AND COST-EFFECTIVE DETECTION OF TILL-FRAUD ACROSS HUGE QUANTITIES OF COMPLEX TRANSACTION DATA, INCLUDING THE CASES NEAR-INVISIBLE TO HUMANS."

Till-fraud always leaves a trace in the POS data, which is vulnerable to detection by AI and ML LP technologies.

Continued from previous page ·····

in the training data. New POS data are reviewed, and departures from the majority are flagged to LP staff.

When used in conjunction, both models can be very successful in till-fraud detection and prevention.

Challenges

The application of AI and ML to POS data is not a magic panacea for retail shrinkage – quite often older POS data may be too poor in quality or lack sufficient breadth to be used for training. Therefore, POS data collection and quality control need to form a vital part of the retailer's data management operations underpinning its LP strategy. Indeed, the bigger and better the training data set in terms of accuracy and breadth of coverage, the better the detection rate ('true positives) of the models.

Furthermore, the key problem to be faced by APAC LP staff – as faced by LP staff elsewhere – is that sophisticated till-fraudsters are good at inventing new fraud variants. In that environment, supervised models can be ineffective because they are exposed to cases for which they have no exemplar. To improve detection rates, unsupervised models should be run in parallel with the supervised ones as they are generally better at detecting novel types of till-fraud.

POS data integration with the next generation of 'intelligent' cameras

Numerical POS data is not the only weapon in the AI ML armoury – it is rapidly becoming augmented by video data from the new generation of 'intelligent', high-resolution micro-cameras that already have some built-in AI functionality. These cameras can be installed over POS locations, providing a visual dimension to the POS data incident that triggered the fraud alert. They can also supplement POS data in the definition of new exemplars for use in supervised models. Furthermore, they are tamper-proof in that they alert LP staff when their orientation has been changed from that when originally installed.

More importantly, 'intelligent' video data can be analysed by pattern-recognition models just as easily as numerical POS data. Where POS and 'intelligent' video data are integrated, they can improve detection of a number of till-fraud variants such as non-scanning (by the till-operator), basket (customer failure to scan), and sweet-hearting (till operator acting in collusion with a third-party).

Implementing a till-fraud prevention strategy based on AI/ML

A retailer embarking upon an AI/ML-based till-fraud prevention strategy will start with its own historical POS data, ensuring that the data are fit for purpose in terms of quality and breadth. If inadequate POS data are available, it may be possible to adapt some industry-standard generic exemplars for training the supervised models, but the retailer must ensure that these generic exemplars are directly relevant to its own situation. Unsupervised models should not have this problem, but would suffer from poor training data because of the principle of 'garbage-in garbage-out'. Resolving any past and present POS data-quality issues must be the retailer's top priority.

Given the strengths and weaknesses of supervised and unsupervised models in dealing with innovative till-frauds, the retailer is recommended to implement both models in parallel as part of their LP strategy. Also, when fraudsters develop a new variant of till-fraud, it becomes mandatory to add the appropriate exemplar to the supervised model's training data.

Once the retailer's chosen AI/ML models have been trained on historical POS data (with or without 'intelligent' video data), the next step is to design and run a set of basic operational reports that keeps incoming POS data under surveillance, flagging suspicious cases. Above these operational reports is likely to be a layer of more in-depth, forensic analysis reports that will confirm (or reject) the need for further escalation. They will form the basis for further action, be it staff disciplinary, criminal prosecution, and/or recovery of lost goods.

The last step involves updating the POS datasets used to train the AI/ML models with fresh POS data. Cases that don't quite 'fit' will be subject to more intensive forensic analysis because they may be indicative of a new type of till-

····· *Continued on next page*

Newer generation "intelligent" cameras installed over POS locations can capture POS fraud incidents and even detect when their original orientation has been altered.

Continued from previous page ·····

fraud, one that needs to be added to the list of exemplars.

Conclusions

In APAC, the use of AI/ML - based models is very likely to be more efficient than the traditional methods of fighting till-fraud reviewed in Part 1. This is due to four reasons:

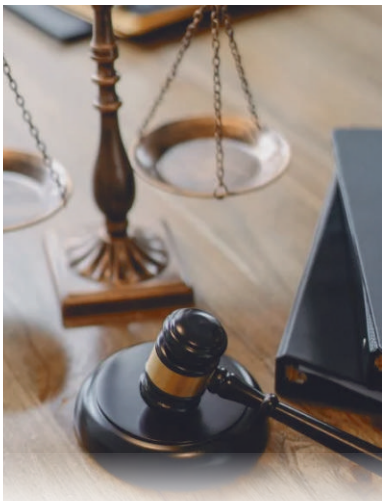
(1) As POS datasets get larger and broader, AI/ML-based models have far greater analytical capabilities than human LP staff, providing far deeper insight into patterns of fraudulent transactions. Traditional methods of fraud can be detected with greater certainty, and new methods, previously invisible to humans, can be identified, allowing LP staff to keep pace with the ever-innovative fraudsters.

(2) The training of LP staff is easier when using an AI/ML-based system because the system itself has already eliminated a lot of the noise distorting the signal. Therefore, LP staff will not require months, even years, of training and experience to attune their fraud-detection skills to the levels required to catch the more sophisticated fraudsters.

(3) The integration of POS data with 'intelligent' video data under an AI/ML analytical umbrella massively strengthens the evidence base of the case against suspected fraudsters. This makes the taking of staff disciplinary action easier, and, where necessary, makes criminal prosecutions more certain of success. It also improves the chances of recovering stolen goods or monies. Regular reviews also enable LP staff to improve their security procedures.

(4) AI/ML-based models offer stronger deterrence and improved staff morale. Lone staff will be discouraged from committing POS fraud by virtue of the strength and immediacy of the surveillance. Staff normally intimidated into being part of a gang, or frightened into silence, would be greatly reassured to know that the burden-of-proof advantage now lies with the LP staff and not the fraudsters, so the barriers to 'whistle-blowing' are reduced.

We believe that APAC retailers should rapidly adopt the new generation of AI/ML-based models in their fight against till-fraud. In a retail world plagued with an ever-rising level of fraudster-sophistication, it may become retailers' only sound means to stem the rise in APAC retail shrinkage.



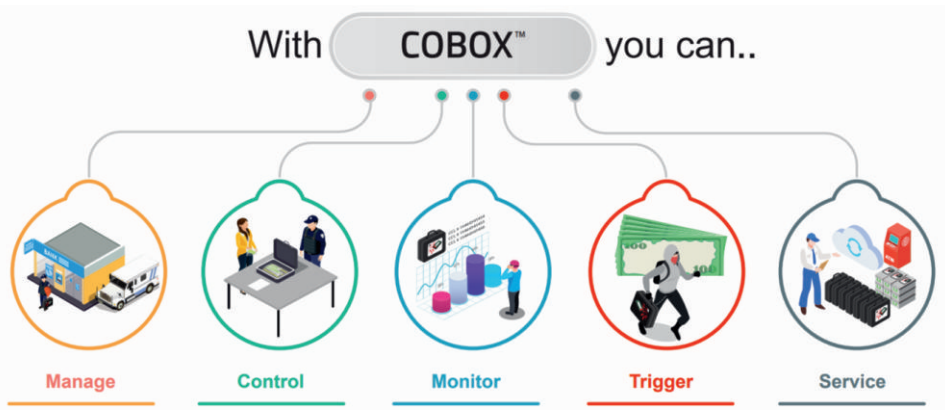
AI/ML systems provide much stronger evidence to support disciplinary action or even legal prosecution against till-fraud.

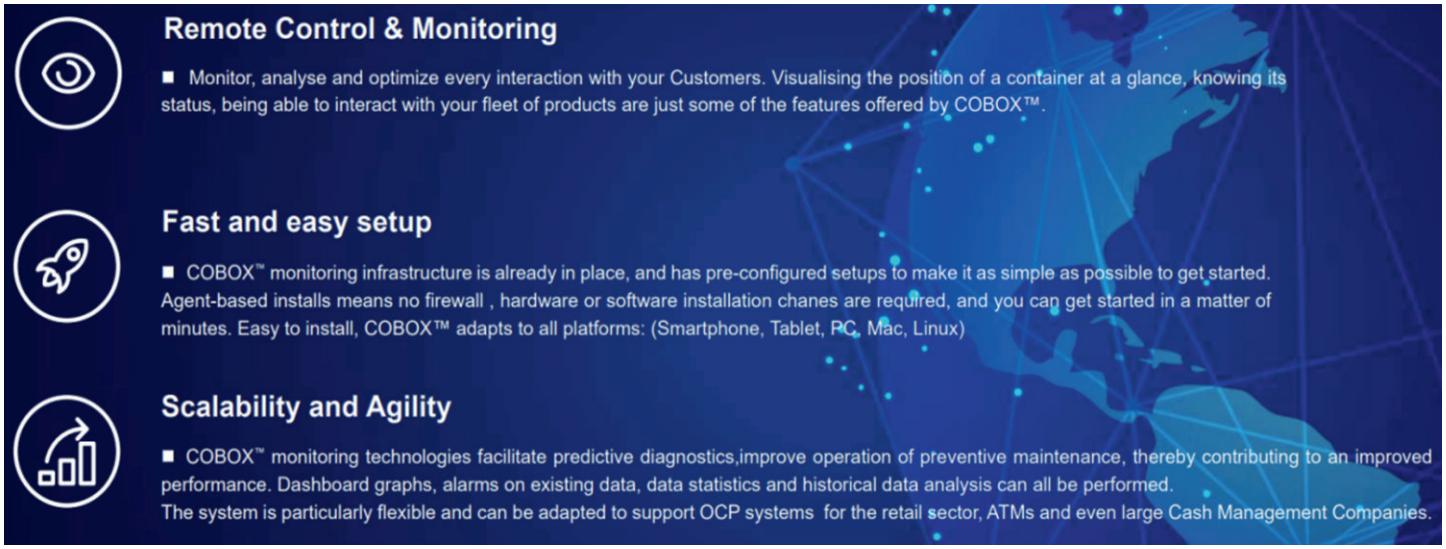
MEMBERS' NEWSBOARD - LATEST STORIES FROM ACMA MEMBERS

COBOX: CONTROL AND MANAGEMENT SYSTEM
OBERTHUR CASH PROTECTION

COBOX™ is a customizable solution dedicated to the operational control, monitoring, and maintenance of Oberthur Cash Protection solutions.

Web-based, utilizing the very latest date protection technologies, it allows our customers to remotely interact and monitor the status of their OCP fleet in real-time.

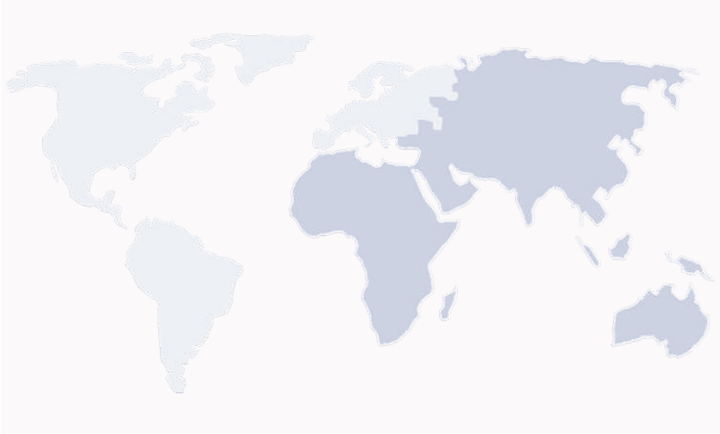




For more details, please feel free to visit our website, linkedin page for latest update.
Write to us at ocp@oberthurcp.com

ADVERTISE WITH US

ACMA CURRENCY NOTES is a quarterly industry newsletter read by over 3000 professionals in the cash handling industry globally.
Advertise with us to increase your presence across Asia, Africa, and Australia & Oceania.



Members pay
***$400** for a full-page advertisement;*
***$200** for a half page; and*
***$100** for a quarter page.*

Non-members pay double.

*We also offer a **free quarter page advertisement space** to contributors who provide a **full-length article** for the main section.*

Send enquiries to Tan Chee Meng at: tancmsia@gmail.com

ABOUT ACMA

Mission

To provide a platform for Cash Management Companies (CMCs) in Asia, Africa and Australia & Oceania to raise their professional reputation and standing in the Cash Handling and Cash Management Industry, and to act as a representative with the appropriate authorities on issues of common interest.

Founding Members

AB Securitas	*Phiroze Kevin Pestonjee*
Currency Research	*Richard Haycock*
Linfox Armaguard	*Scott Forster*
Spearpoint Group	*Ted Devereux*

Office Bearers

Chairman	*Óscar Esteban*, Prosegur
Executive Director	*Ted Devereux*, Spearpoint Security Group
Secretary	*Tan Chee Meng*, Currency Research

Committee Members

Steven Cole, Marsh Ltd
Scott Forster, Linfox Armaguard
Stephan Kazes, Loomis International
Huseyin Memis, Shrap
Baskaran Narayanan, Brink's
Kesavamani Narayanan, G+D Currency Technology
Phiroze Pestonjee, AB Securitas
Benjamin Thorpe, Glory

www.acma-asia.org

To become a member, write to Tan Chee Meng at:
tancmsia@gmail.com

ACMA CURRENCY NOTES

SHARE YOUR INSIGHTS

If you would like to have an article published in the ACMA Currency Notes, please write to Tan Chee Meng at: tancmsia@gmail.com

Contributors to this issue:

- Mehmet Arikkan
- Dr Mike Earthey
- David Fagleman