

Special EHI publication

Self-Checkout Inspiration Guide

10 years of the SCO Initiative

Market
Components
Examples from practice
24/7 stores
Digital shopping carts
Theft prevention
AI applications
Outlook

EHI



**SELF-
CHECKOUT
INITIATIVE**



SELF-CHECKOUT INITIATIVE

For new momentum in retailing.

The task of this initiative is to provide a systematic collection of data and information on self-checkout systems based on reports from retailers and statements by consumers.

It is meant to give retailers objective information for decisions on implementing a self-checkout solution.

The data were collected by the EHI Retail Institute and independently analysed.

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This initiative is supported by the following companies:

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10 years of the SCO Initiative

Why don't retailers in Germany offer self-checkout terminals or self-scanning solutions? This was the question that gave rise to EHI's Self-Checkout Initiative back in 2014. Wincor-Nixdorf had put the question to EHI at an in-house fair in Germany's Eastern Westphalia region. And to be honest, we had no answer at that time.

Self-checkout terminals were well established in other countries, but in Germany they were few and far between. Ikea, Real and a few independent grocers had made a start, but that was it. Thus it was high time to take a closer look at the question.

A number of companies were quick to offer their support, and the EHI Self-Checkout Initiative was born.

The first task was to conduct a major survey of consumers in Germany. The results were surprising: few people had ever used a self-checkout system, but those who had were very satisfied. And non-users expressed considerable interest. Our first big customer survey therefore clearly showed that the demand for self-checkout systems went beyond what retailers had been offering.

This study was followed by further retailer surveys and talks with retail employees, plus many roundtable discussions and events. Within a short time, a large community devoted to self-scanning and self-checkout came into being.

The original project, which was planned only as a one-off undertaking, grew to become a continuing initiative, and now it is celebrating its tenth anniversary. In Germany, much has been achieved during this period. Our regular surveys relating to installations of self-checkout terminals in Germany have shown a steep rise in the number of systems offered. Today hardly any store can open without providing a solution of this kind. This applies to food retail, but increasingly also to non-food.

Our thanks go out to our partners who have supported this work in the last decade, either intermittently or on a continuous basis. We also thank

the representatives of the retail industry who have participated in our events on this topic and have repeatedly contributed information and data to our work.

Today there is a huge selection of self-scanning systems in Germany. The range includes permanently installed terminals, mobile systems, solutions for customers' mobile phones, shopping carts with built-in scanners or video cameras and, finally, fully automatic stores. The German retail sector has thus become a trailblazer in this area, equal in every way to those in other countries.

And we believe this is good. First of all, many people now clearly prefer self-checkout terminals to conventional systems. And second, we must not lose sight of the labour market. In the future it will become increasingly difficult to find enough staff for the checkout zone.

All in all, we still have a lot to do. By looking back to the many successes of our initiative in the past, we'll find inspiration for the future.



Michael Gerling
Managing Director
EHI Retail Institute



Frank Horst
Project Director
Self-Checkout Initiative
EHI Retail Institute

Photo: dm/Silke Walz



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Photo: ITAB Germany

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Photo: Inter IKEA Systems B.V.



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Photo: Axis Communications GmbH

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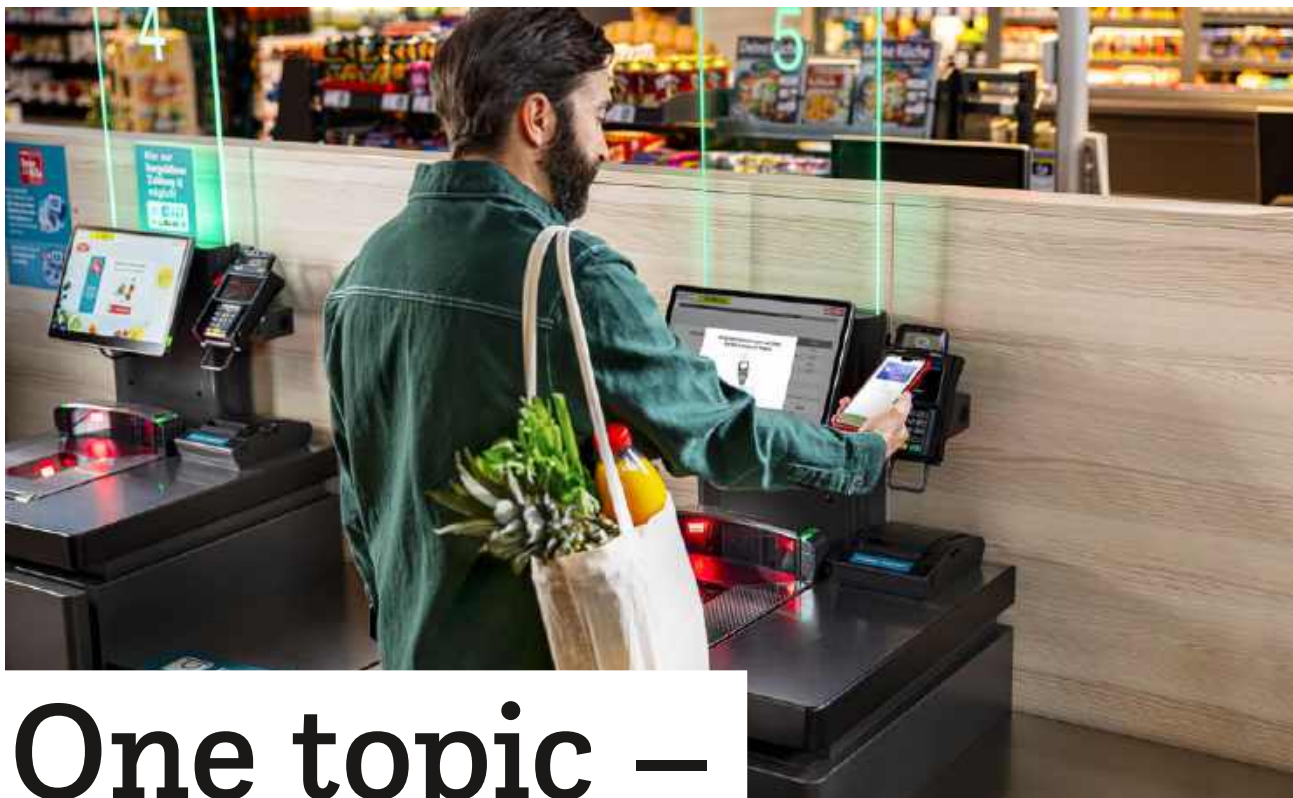
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Photo: Rewe



One topic – many solutions

Recent advances in technology have given retailers a number of effective tools for accelerating transactions and making them easier for customers. These include mobile self-scanning with a smartphone or handheld device, and scanning and paying at a stationary self-checkout terminal. With increasing user acceptance, retailers are gaining trust in these systems. Labour shortages are giving the trend additional momentum.

It's Saturday morning in the Globus market hall in Cologne-Marsdorf. Long queues have formed at the 13 checkout points. The customers who are waiting here to put their items on the belt must be extremely patient. Right next to these staffed checkouts there is a separate self-checkout zone with five terminals. Here people are coming and going very quickly. These customers, who have already scanned their purchases with a handheld device or smartphone, push their carts to a self-checkout terminal, pay and leave the store without touching their goods again.

Waiting in a queue is not a pleasant way to conclude the shopping experience. With self-scanning, retailers can eliminate this unpleasantness and lessen the burden on conventional checkout points.

Globus realised this and now offers mobile self-scanning in all of its 65 “market halls” and 90 DIY stores. Customers have the option of using their handheld devices or smartphones in addition to stationary checkouts. For other supermarket chains like Edeka and Rewe, as well as non-food retailers, self-scanning technologies have become a matter of course. “Nowadays, no new or renovated store in the food retail sector is planned without self-checkouts,” says Klaus Schmid, Managing Director of ITAB Germany, a provider of checkout systems in Europe.

GROWTH SURGE Regular surveys conducted by the EHI Retail Institute on the spread of self-scanning and self-checkout systems have shown rapid growth in the use of self-scanning technologies. As



Photo: Scansation



Photo: Globus



Photo: KBST

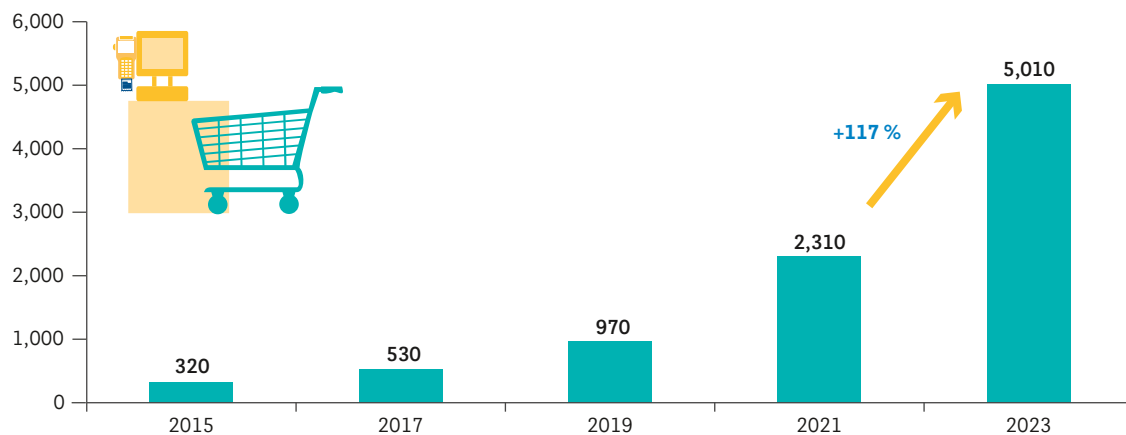
of August 2023, more than 5,000 stores in Germany offered their customers the option of taking payment transactions into their own hands. Thus the number of stores with self-scanning options more than doubled within two years. The increase was especially noticeable with stationary self-checkout terminals. These were available in 4,270 stores at

the time of the survey (+153 percent). Mobile self-scanning using a hand scanner, a shopping cart with an integrated scanner or an app on a personal smartphone was offered in 2,152 stores (+119 percent). The study showed that different options were often offered to customers. In over 1,400 stores at least two self-checkout variants were available.

Number of stores with self-checkout options

Stationary and mobile

Absolute figures



Source: EHI market surveys for Germany, valid for August of each year

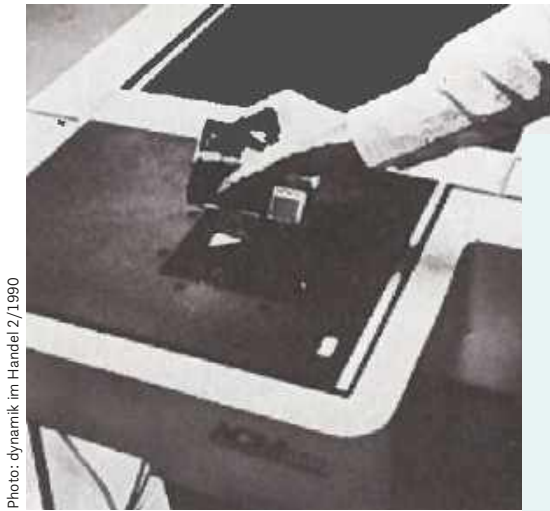


Photo: dynamik im Handel 2/1990

SCO pioneer "CheckRobot"

CHECK ROBOT

How it all began

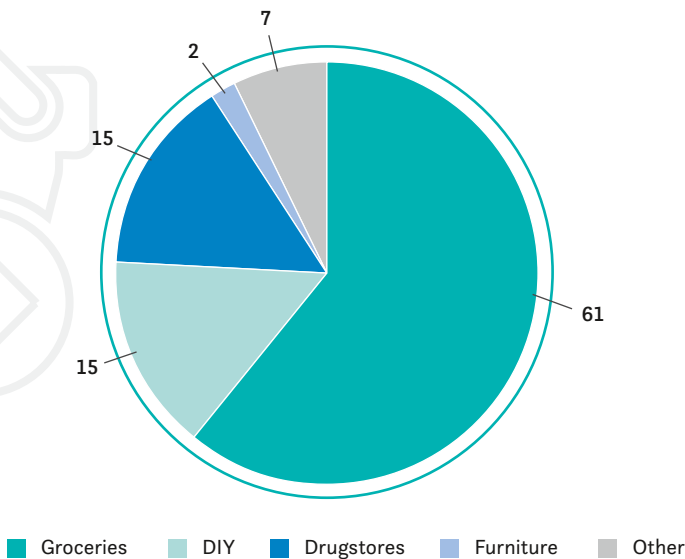
The first prototype of a self-checkout terminal was developed in the early 1980s by the American David R. Humble, head of the IT company CheckRobot in Florida. The terminal was first installed in a Kroger store in Atlanta in July 1986. This "CheckRobot" was a big attraction at EuroShop 1990 in Düsseldorf. It was presented in a cooperation project with the south German checkout counter manufacturer Harr (photo).

More than 60 percent of the stores with stationary self-checkout terminals were in the food sector, representing a market share in this sector of roughly 7.5 percent. In August 2023, more than 750 stores in both the Rewe Group and the Edeka Group were equipped with stationary self-checkout terminals. Aldi-Süd, Kaufland, Lidl, Penny and Netto reported figures of 200 stores and in some cases significant-

ly higher numbers. Food retailers were followed by drugstores and do-it-yourself supply stores, each of which had 15 percent of their stores with a self-checkout option. In some cases the number of stores with self-scanning technologies was well above 150. This was the case for Rossmann, dm-drogerie markt, Bauhaus, Globus, Hornbach and Obi. Stores in other non-food sectors with self-checkout terminals included Bershka, Decathlon, Ikea, Thalia and Uniqlo.

Transactions with self-checkout terminals according to sectors

Figures in percent



Basis: 4,270 transactions

Source: EHI market survey for Germany, August 2023

ADDITIONAL CUSTOMER SERVICE One of the most important reasons to use self-scanning systems is to save time. A survey of customers by EHI has shown that for 98 percent the main reason for using these systems is to avoid unpacking and repacking their purchases. The next most important reason is to avoid waiting times at the checkout (94 percent) and get through the payment process more quickly (93 percent). Another important argument by customers is that they want to carry out transactions at their own pace (79 percent).

By offering customers the option to scan their own items – at a stationary checkout point or with a mobile device at shelves – stores give them the advantage of shorter waiting times without bothersome unpacking of goods. In this way retailers can invest in customer satisfaction, a factor that is critically important to their existence. On the other hand, an investment in self-checkout equipment must pay off economically.

To install four stationary self-checkout terminals with cash payment modules including IT, a

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Photo: Netto Markendiscount



Photo: dm/Silke Walz

Left: Pick & go stores operated by Netto in Regensburg

Right: dm is operating some 1,000 self-checkouts in its German stores



SELF-CHECKOUTS

The variants

STATIONARY SELF-CHECKOUT

Self-checkout as a bagging station for one or more shopping bags. Monitoring with integrated scales possible. Includes an integrated payment module for cash or cashless payment. Preferably for small purchases.

MOBILE SELF-SCANNING WITH A HANDHELD DEVICE OR SMARTPHONE

Customers scan items with a handheld device while shopping (industrial scanner or own smartphone). Payment at a stationary checkout point, payment terminal or with an app. Advantageous for larger purchases.

MOBILE SELF-SCANNING AT THE SHOPPING CART

The variant with the “smart trolley”: the scanner is either attached to the cart or connected via cable to a permanently mounted microcomputer. Monitoring via cameras and weight sensors.

FULLY AUTONOMOUS GRAB & GO STORES

AI technology, computer vision and weight sensors register each item removed from the shelves. Shoppers leave the store without actively paying. Currently 17 test installations in Germany.

AUTOMATIC SCANNING

Barcode readers and sensors for optical image recognition automatically record items on the checkout belt in the “tunnel scanner”. Isolated test installations in retail stores have not been fully successful.

retailer must reckon with procurement costs of approximately 80,000 euros. The investment costs are lower without cash modules, but there is a risk of losing some customers. The payment options at self-checkout terminals reflect the trend to more cashless transactions. According to the EHI survey in 2017, 98 percent of retailers offered customers the option of paying with cash, but in 2023 only 45 percent of self-checkout terminals were equipped with cash payment modules. In Germany at least, cash is still preferred for small purchases, which is why most retailers continue to plan with cash management systems, often as a mix of cash and cashless stations. Providers of technology also recommend a multi-track approach to retailers, depending on the sector. Martijn Termaten, Retail Sales Director of Pan Oston, a Dutch manufacturer of checkout counters and self-checkout terminals: “Consumers want to be able to choose how they pay. For that reason retail companies should offer their customers a mixture of cash and cashless payment stations.”

STAFFING AS A KEY FACTOR Customer satisfaction is one aspect to consider. Another factor currently contributing to the demand for self-checkout systems by retailers is the shortage of qualified retail workers. The objection often heard in the past that self-checkout systems are job killers has lost much of its weight in the light of staff shortages.

The employees at SCO terminals are an important factor in the successful introduction of SCO systems and have a key influence on acceptance and usage rates. According to research by EHI in the Self-Checkout Initiative, almost two thirds of the employees interviewed find their work pleasant and

Looking back



Photo: CSE Communicationstechnik

■ **June 2000**
Edeka business operator Holger Beiter from Erfstadt is one of the first retailers in Germany to test a mobile self-scanning application.



Photo: Metro Group

■ **April 2003**
German premiere: NCR's "FastLane" self-checkout in the Metro Future Store is the first such installation in the German retail sector.



Photo: Wincor Nixdorf

■ **March 2005**
In Munich, Edeka retailer Peter Simmel opens the first store to offer only self-scanning. It has twelve self-scanning systems and six payment stations.



Photo: Wincor Nixdorf

■ **May 2007**
Saturn in Ingolstadt is the first store of the electronics retailer with self-checkout terminals. Employees give assistance during the start-up phase.



Photo: Wincor Nixdorf

■ **February 2009**
After successful tests in furniture stores in Sindelfingen and Dresden, Ikea Germany rolls out self-checkout terminals throughout Germany.



Photo: Motorola

■ **February 2010**
Feneberg Lebensmittel from Kempten (Allgäu region) is the first retailer in Germany to roll out a mobile self-scanning application.



Photo: Wincor Nixdorf

■ **May 2011**
The Rewe Group tests an automated scanner at its centre in Zülpich. A few obstacles have to be overcome before practical implementation.



Photo: Scansation

■ **August 2017**
Bring your own device: Edeka Isargärten in Munich offers its customers a mobile self-scanning solution for smartphones.



Photo: Rewe Group

■ **October 2021**▶
Rewe opens the first supermarket with pick & go technology. The seventh pick & go store was opened in July 2024.

Photo: Glory



Above: Cash recyclers at the SCO can also be used for cashback service

Left: Scan & go at Rewe



Photo: Rewe

varied. Besides helping customers to use the system, SCO employees carry out age checks, and they provide security by watching closely whether all products are recorded. Manufacturers provide introductions lasting several days, including training and initial support, in order to prepare employees for their tasks.

In practice there is no constellation of self-checkout systems that can fit all stores perfectly. A typical SCO zone in a supermarket comprises four to six SCO terminals in addition to checkout points staffed by cashiers. At Edeka Ueltzhöfer in Heilbronn, for example, six of the seven supermarkets operated by the family-owned company are equipped with self-checkouts. Self-checkouts account for 40 percent of the checkout points. All seven stores also offer mobile scan & go.

The ratio of self-checkouts to staffed checkouts has clearly been increasing in favour of the former type, according to Ralf Landa-Noel of ITAB. He reports that SCO zones in new and refurbished supermarkets often have ten to twelve stations. In Rostock Edeka business operator Ingolf Schubert is running a 1,200 sqm supermarket exclusively with self-checkouts. Discount stores have also been investing in self-checkout terminals. According to the

trade publication Retail Optimiser, Lidl plans by late February 2025 to equip at least 500 of its roughly 3,250 stores in Germany with three or more self-checkouts per store. But these figures could increase significantly. In downtown Cologne, for example, Lidl has a store with 16 self-checkout express stations.

What ultimately counts is to find a configuration that is suited to the store in question. The main parameters for selecting equipment and self-checkout technology are the type of sector, the location, the size of the store and the average checkout receipt. With stationary systems retailers can choose between stationary self-checkout terminals for mounting on a wall or table and scan & bag models like those in many supermarkets. Hanno Kallmeyer of NCR Voyix: “The key to success is often a combination of stationary systems for small and medium-sized purchases and mobile solutions for larger purchases.”

MOBILE SCANNING Between 2021 and 2023, there was a twofold increase in mobile self-scanning solutions with handheld devices and smartphones; however, this growth was exceeded by that for stationary self-scanning solutions. According to the



Lionel Souque
Chief Executive Officer
Rewe Group, Cologne

“By the end of 2024 we’ll have increased the number of supermarkets with self-checkout terminals from just over 1,000 to 1,800. Then almost half of our stores will have them.”

EHI survey for 2023, approximately 1,000 stores provided hand scanners, either for removal from a dispenser at the entrance or as a scanning option right on the shopping cart. Industrial scanners of the latest generation have evolved to become all-purpose multimedia solutions. For example, the model PS 30 from Zebra allows position detection and, thanks to an integrated NFC module, contactless payment.

In 2023 self-scanning with a smartphone app was possible in 1,900 stores in Germany. The users included companies like Rewe, Edeka, Thalia, Penny, Poco, Kaufland, Globus, Netto Markendiscount and Ikea. Thanks in particular to lower investment costs, app solutions can be implemented very quickly for large numbers of stores. However, the utilisation rate has remained low. Two years ago, EHI surveyed 15 retailers that had implemented app solutions in their stores. On average, only 0.67 percent of customers, i.e. only one in 150, took advantage of self-scanning with their own smartphones. In contrast, industrial scanners in the same stores had a much higher utilisation rate of more than seven percent. According to retailers, the obstacles to use for many customers are downloading the app, the associated registration process and the complicated “onboarding” procedure involving logging in at the store, WiFi authentication and input of the necessary smartphone settings.

THEFT PREVENTION The increasing use of SCO systems has put a stronger focus on theft prevention and improved monitoring methods. Inadvertent or deliberate omission of scanning during shopping or at self-checkout points has led to higher loss rates. A number of companies are currently working to minimise these risks. The technical tools being applied include exit turnstiles, weight checks

“Over the long term, I expect that five percent of all receipts will be processed via our self-checkout solutions. At peak times it could be ten percent.”



Lars Rüländer
Head of Customer Experience Management
at L&T, Osnabrück

“In our dm stores we are experiencing high levels of approval and increasing demand for self-checkout terminals. It shows that our customers appreciate this convenient payment service.”



Roman Melcher
Managing Director, dm-drogerie markt

“Currently, on average, one in four of our customers are using SCO terminals. This accounts for 15 percent of sales. 60 percent of our SCO terminals also accept cash.”



Florian Ueltzhöfer
Authorised Officer, Edeka Ueltzhöfer, Heilbronn

using scales, camera surveillance, customer monitoring, inclusion of receipt data in camera images, AI systems for detecting behaviour and/or products, and plausibility checks by means of data analysis. Sufficient staffing in SCO areas is also important here. The trend is to make checking processes smarter by means of computer vision, automatic image recognition, complex algorithms and artificial intelligence.

Self-checkout systems have become an established payment option in retail stores. They offer customers greater self-determination by allowing

them to complete their purchases without standing in queues. For retailers self-checkout systems are an important tool for dealing with shortages of qualified checkout personnel in the labour market. These factors can be expected to increase the willingness of many retailers to make further investments. (Lz) ■

Automatic detection of fraud attempts

Frank Horst, Director of Research on Security and Inventory Discrepancies at EHI, sees the limitation of theft and fraud attempts as a major challenge in the operation of SCO terminals.



Frank Horst
Project Director
Self-Checkout Initiative
EHI Retail Institute

What are the trends and challenges for SCO terminals?

Staffing levels in the retail sector have become very low, and shortages of employees are currently the main reason for installing SCO systems. However, in many stores customers have already come to expect self-checkouts, especially in order to avoid waiting times. Other reasons for customers are an interest in technology and the chance to shop at their own pace while keeping an eye on prices. The biggest challenges are to awaken enthusiasm for SCO systems among other groups of customers and to limit the opportunities for fraud.

Are there statistics or hypotheses on how the trend towards self-checkout systems is affecting theft rates?

SCO terminals are strongly affected by the current increase in store thefts. In general, it can be assumed that the temptation

to commit theft is greater at self-checkout terminals. The theft rate here is 15 to 30 percent higher than at staffed checkouts. The SCO boom and the associated rise in SCO sales figures will thus have a growing impact on inventory discrepancies.

How can retailers combat the increasing theft at SCO terminals?

It is essential for employees to exercise greater vigilance and be able to confront suspected thieves. Technical support is already available in the form of weight checks, exit turnstiles, monitors and camera systems. In particular, through the use of AI-based cameras for identifying products, monitoring behaviour and analysing data, it will be possible to detect attempted theft and fraud through largely automated processes and generate alarms. However, human intervention will continue to be indispensable.



The checkout zone in times of change

using Mars Wrigley self-scanning checkouts to encourage impulse buying

According to a study by the EHI Institute for Mars Wrigley, the checkout zone continues to be a source of high sales in spite of occupying little space. Approximately 5 percent of sales are generated on about 1 percent of the store area. At the same time, we are witnessing a change in the payment process. Self-scanning checkouts are becoming increasingly prevalent. Shoppers with fewer than an average of 6.5 products are more likely to select a self-checkout terminal than their customary checkout point with conveyor belt¹. This has consequences for purchasing behaviour. When shoppers are able to pay faster or are occupied with the self-scanning terminal, they have less time for impulse buying.

However, their need for a “reward” or “refreshment” at the end of the transaction remains. Mars Wrigley will be glad to give you advice spanning all product categories. We can create a comprehensive solution for your checkout zone that maximises the impulse effect and offers a high sales potential. We offer a variety of formats for self-scanning checkouts – from very small modules to customer flow systems. Initial tests with upstream customer flow systems have shown that purchase rates can be achieved that are similar to those with staffed checkouts. If you are interested, contact your customer advisory team at Mars Wrigley.

Our three top tips for self-scanning checkouts:

- Keep all checkout points open because an unused self-scanning terminal means lower potential sales. Even small modules with impulse merchandise can help fill shopping baskets.
- Place impulse merchandise in the checkout entrance area or right at the terminals. The impulse effect is greatest when shoppers are not yet occupied with paying.
- “Reward” shoppers and put the focus on “refreshment” by displaying highly tempting products like chewing gum and chocolate bars.

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¹ Source: US VideoMining Large Store Analysis, 2021

Custom solutions

Stationary SCOs, mobile self-scanning, compact kiosk terminals and fully automatic self-checkout. Food retail reflects the entire range of self-checkout solutions. Photo impressions of practical examples



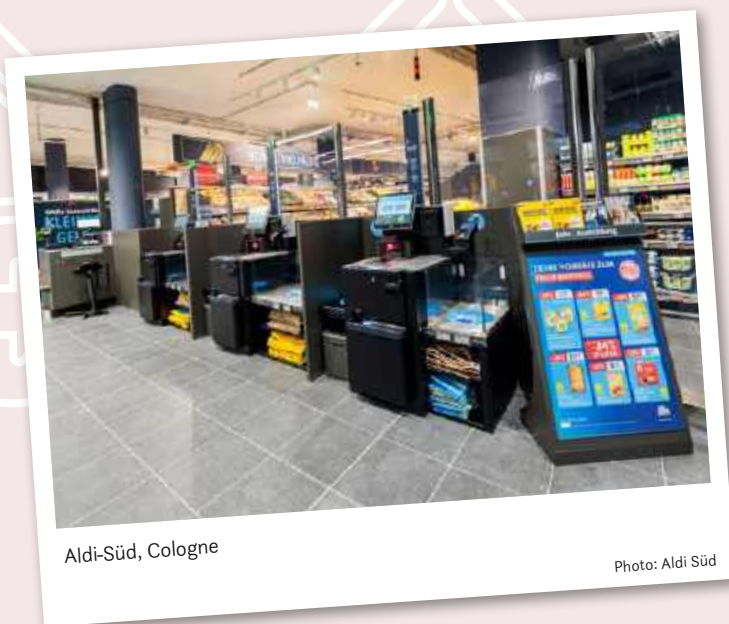
Edeka Paschmann, Mülheim a. d. Ruhr

Photo: Paschmann



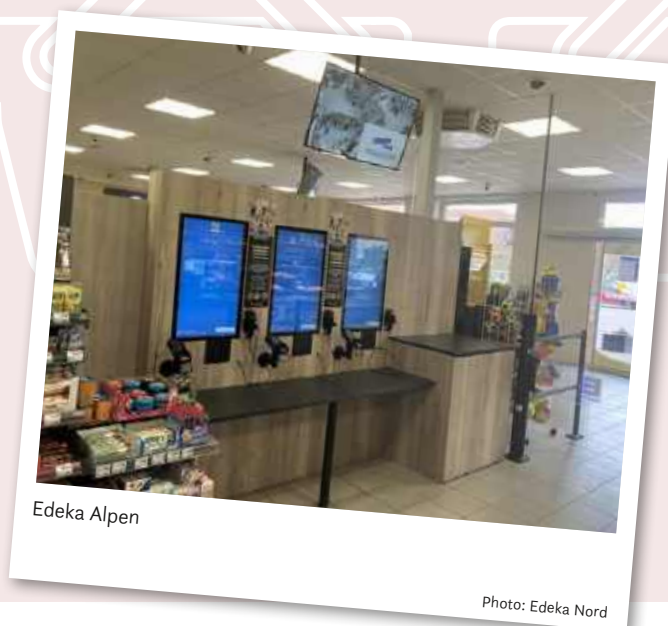
Rewe Pick&Go, Hamburg

Photo: Rewe



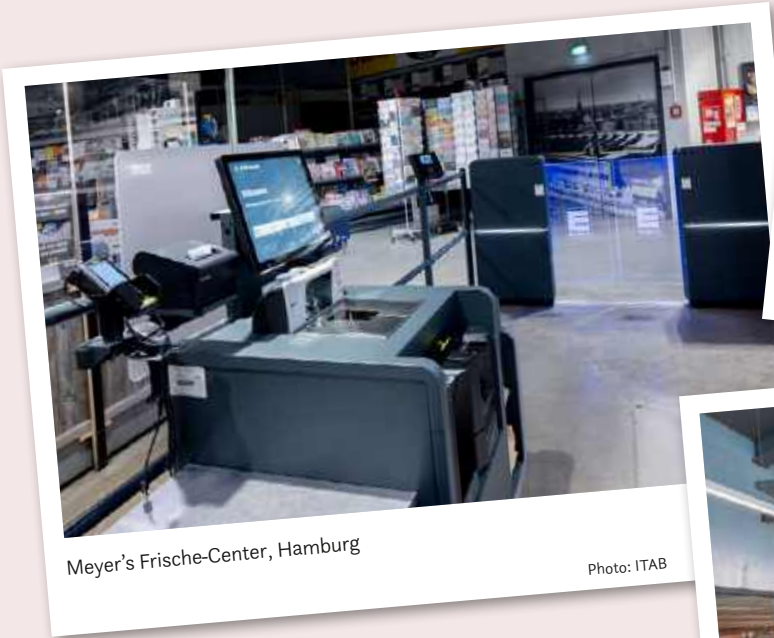
Aldi-Süd, Cologne

Photo: Aldi Süd



Edeka Alpen

Photo: Edeka Nord



Meyer's Frische-Center, Hamburg

Photo: ITAB



Edeka Minden-Hannover

Photo: Pentland Firth



Aldi Nord, Netherlands

Photo: Aldi Nord



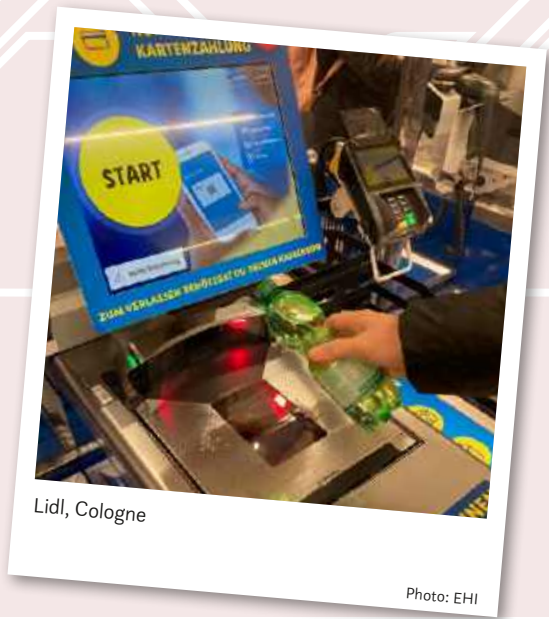
Edeka Hessenring

Photo: KBST



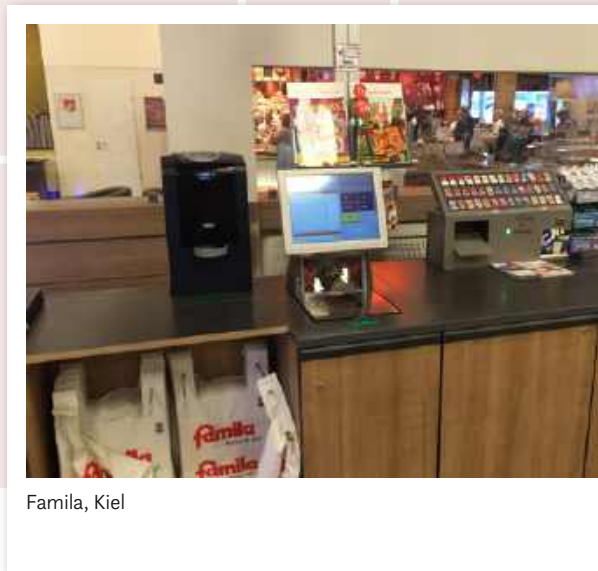
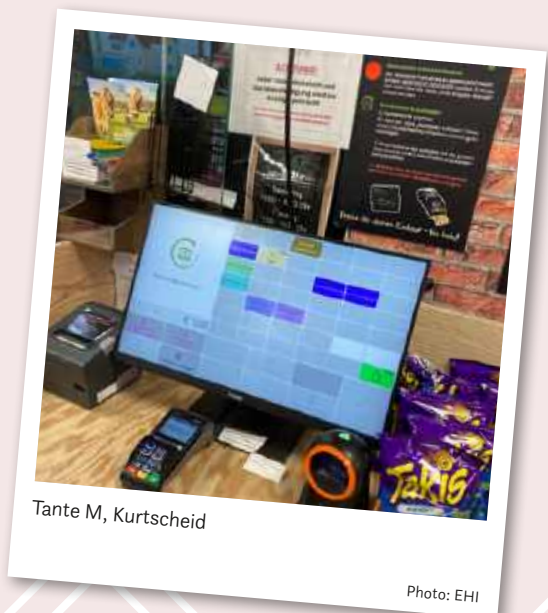
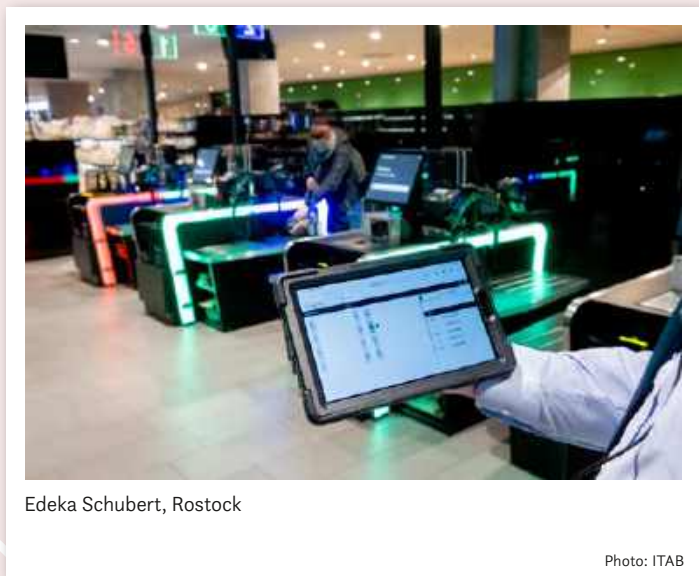
Lidl, Cologne

Photo: EHI



Lidl, Cologne

Photo: EHI





Rewe

Photo: Mars



V-Mini, Kaufbeuren

Photo: Wanzl



Tee Gschwendner

Photo: Pyramid



Rewe

Photo: Mars



Meyer's Frische-Center, Hamburg

Photo: EHI

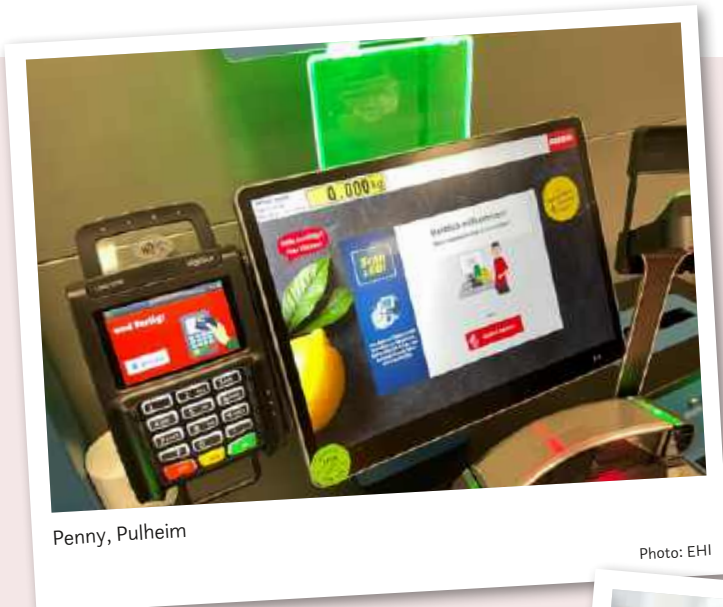


Edeka Frauen, Glückstadt

Photo: EHI

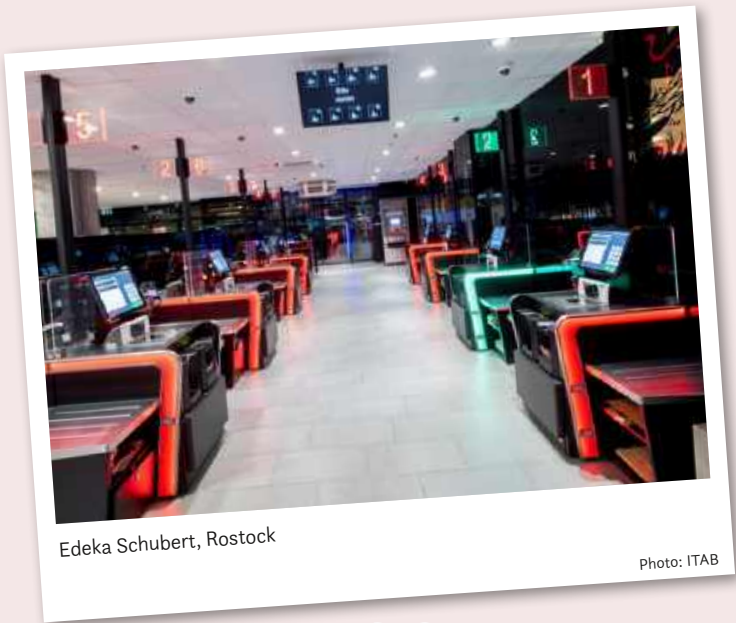


Photo: EHI



Penny, Pulheim

Photo: EHI



Edeka Schubert, Rostock

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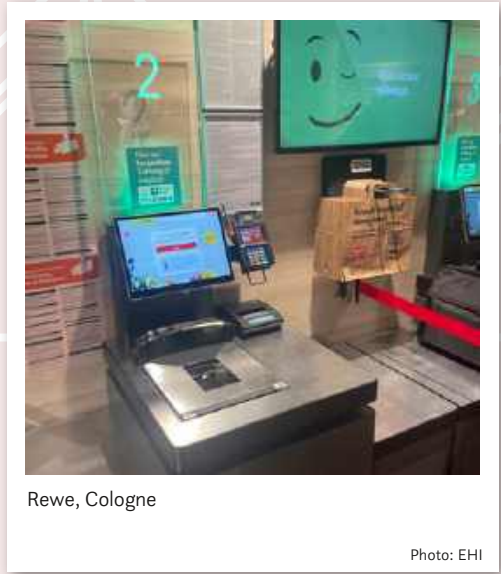
Edeka Hessenring

Photo: KBST



Meyer's Frische-Center, Hamburg

Photo: ITAB



Rewe, Cologne

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Auchan, France

Photo: Toshiba



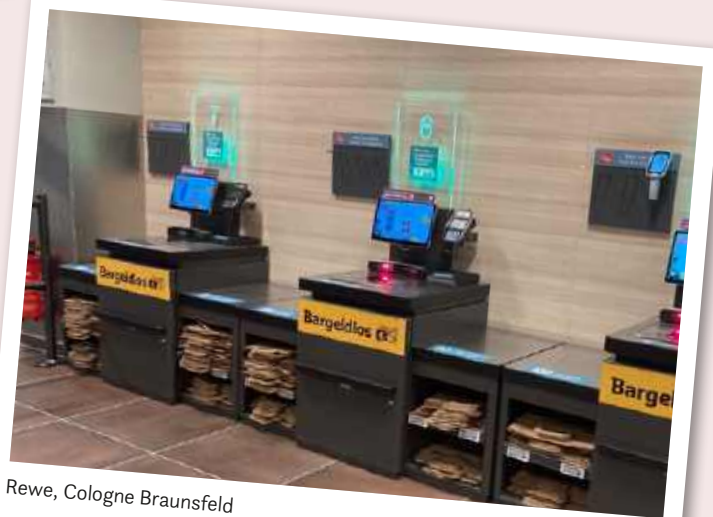
Auchan, Romania

Photo: Shopreme



Aldi-Süd, Hürth

Photo: EHI



Rewe, Cologne Braunsfeld

Photo: EHI



Kaufland, Cologne

Photo: EHI



Edeka Schubert, Rostock

Photo: EHI



Photos (3): ITAB Germany

Customers expect self-checkouts

Meyer's Frische-Center, with some 100 self-checkout terminals in nine supermarkets, is the leading independent food retailer in northern Germany. We talked with Jörg Meyer and Tom Riedemann in Hamburg's Rindermarkthalle (cattle market hall), where the company operates a 5,000-sqm Edeka supermarket with 20 SCO terminals.

The interview was conducted by Frank Horst and Winfried Lambertz



Jörg Meyer
Managing Director,
Meyer's Frische-Center, Hamburg

Mr Meyer, self-checkout systems are a permanent part of the inventory in your supermarkets. When did you introduce them, and how would you describe the situation today?

Meyer: We started in early 2022 with our Edeka store in List on the island of Sylt. Today this store has ten SCOs and one staffed checkout. In the same year we installed five SCOs in Hamburg's Rindermarkthalle. Today, after three expansion stages, we're operating 20 SCO terminals and eight staffed checkouts in this supermarket. All in all, we currently have some 100 self-checkout terminals in our ten supermarkets. This makes us the market leader in

northern Germany. Solely cashier-operated checkouts can be found only in our smallest store in Hamburg-Niendorf.

Riedemann: In all the other stores we have an SCO zone with at least eight self-service terminals. Here we would not add individual checkout points but expand the system block by block.

This rapid expansion rate is an indication that self-scanning is fully accepted by your customers.

Riedemann: Each SCO zone that we installed immediately achieved a sales share of 20 to 25 percent. In the mean-

Above left: The SCO zone in Meyer's Frische-Center in Hamburg's Rindermarkthalle has 20 self-service checkouts.

Centre left: Each SCO zone is equipped with at least one self-service checkout with a cash module.



The customer feedback is uniformly positive, regardless of age.



Tom Riedemann
Authorised Officer,
Meyer's Frische-Center, Hamburg

time our customers have become used to these systems and they know exactly how they work. The customer feedback is uniformly positive, regardless of age.

Meyer: Customers are now demanding that we offer self-checkouts. However, with a share of 45 to 50 percent from SCO sales in the Rindermarkthalle and our Ölmühlenweg store in Hamburg Wandsbek, we think we have reached a limit. In the surrounding area the barrier is 25 to 35 percent.

Do think this will change eventually?

Riedemann: It's a question of time. In cities, people are more open to innovations. Here the problem of labour shortages is better known. However, in the surrounding areas we sense more resistance and a greater need for discussions on the part of customers.

The shortage of labour is the main reason for investments in self-scanning technologies by retailers. Can you name other reasons?

Meyer: Here, at our Rindermarkthalle store, our goal was to focus on small purchases with SCO. That is exactly how it went. For customers it's easier and quicker to buy a sandwich or a drink at the self-checkout instead of standing in line at a staffed checkout point.

How is this reflected in your statistics?

Meyer: The share of SCO receipts is at 50 to 55 percent, well above the rate I mentioned of 40 to 45 percent. For all the stores as a whole, the share of receipts from SCO is 20 to 25 percent lower than that for staffed checkouts.

What are the efficiency advantages of self-checkouts as compared with staffed checkouts? Is there an advantage in having more SCO terminals than staffed checkouts in a given space?

Riedemann: That is not an argument for us, because a staffed checkout has considerably more sales than a self-checkout. According to our experience four SCO terminals can replace one normal checkout. With eight SCO terminals and one supervisor we save a full-time employee.

Meyer: The ideal would be to have opening hours during which we can manage with lower staffing. We could then allow our employees to go home

by 7:00 or 8:00 p.m. and allow work to continue with a minimal staff. This is what we're aiming for.

What are your estimated staffing requirements for SCO terminals?

Riedemann: In the case of two blocks, each with eight self-checkouts, a system can be managed by two persons. Before holidays and on weekends three staff members might be necessary. During times of the day with low traffic, when only one SCO zone is open, we can manage with one person.

What is the best place for a self-checkout zone according to your experience?

Meyer: The best place is at the centre where customers emerge from shopping, not at the left or right. If we were to put this zone somewhere else, customers would look for a staffed checkout and go right to it.

Are all of the SCO terminals in your stores equipped with cash modules?

Riedemann: Cash changers are a necessity. In each SCO zone we have at least one checkout point with a cash module, and in most cases there are two. Equipping all of our SCOs with cash changers would be extremely expensive. What's more, these machines are frequently out of order. Cash is used for eight to ten percent of SCO sales, and cards are being used increasingly.

MEYER'S FRISCHE-CENTER, HAMBURG

Owner Bert, Jörg and Susanne Meyer
Established 1980
Number of stores 10
Sales area 26,800 sqm
Annual turnover in 2023 €185 million
Employees 825



Exit gates open after the receipt is scanned

Photo: ITAB Germany

Have you used other self-scanning technologies in your stores besides stationary self-checkouts?

Meyer: We tested scan & go, but after a while we turned off the app. We had better hopes for this.

Riedemann: I think that many customers don't want to use their expensive phones for scanning in a supermarket.

Meyer: For a while we also tested shopping carts with displays, hand scanners and checkweighers.

Successfully?

Riedemann: These digital shopping carts accounted for only three percent of sales. We think that the weigher in the cart was responsible for the low customer acceptance. Another factor is that we have a very large selection of fruits and vegetables in our stores. According to our experience, the system is not well suited for this.

Meyer: If there were a system that could immediately detect and weigh tomatoes that I put in my cart, I

wouldn't hesitate to buy 20 such carts for a store.

In the area of Edeka Nord there are still no food retailers who offer their customers hand scanners for mobile scanning.

Riedemann: That will soon change. Pilot applications are planned for this autumn. We're glad that Edeka Nord is taking this path, and we plan to test this technology in our Prisdorf store.

Self-scanning carries the risk of greater inventory discrepancies on account of deliberate or inadvertent skip-scanning at the checkout point. What steps are you taking to counter-act losses?

Meyer: We're working with exit gates that open after a receipt is scanned. Our customers are accepting this security measure because the technology is simple and easy to understand.

Are you using camera systems in SCO zones?

Riedemann: We haven't yet found a technology that really works for us. What's the point of a system that re-

ports 500 suspicious cases per day, each of which has to be evaluated by our staff? We need a workable system that reports only clear cases. At present we're in a test phase to detect instances in which a customer purposely does not scan an item. This technology will gain ground in the medium or long term.

In what other areas do you see a potential for remedies or improvements in self-checkout zones?

Meyer: Reliable optical identification of fruits and vegetables at the self-checkout. I can't see why artificial intelligence should not be able to distinguish between a courgette and a cucumber on the scales.

You mentioned that you've reached a 50 percent limit on the share of sales from SCO in your store. Do you think that this value will increase in the future?

Meyer: The more that other retailers use self-checkouts, the faster we'll have higher usage rates in our stores as well. For this, many more businesses must invest in self-checkouts. If discount stores also begin to invest more heavily in self-checkout terminals, this will give the trend an additional push. ■

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Photo: Rossmann

Following in the footsteps of food retailers

It was almost unimaginable five years ago, and now it's a reality: stores in a wide range of sectors – fashion, sporting goods, furniture and even books and toys – are installing self-checkouts to facilitate quick and independent purchasing of merchandise by customers. At the same time this is giving stores a way to overcome staff shortages. Thus self-service technology is starting to play an essential role in non-food retail.

Europe's largest VEDES store for toys, games, sporting goods and outdoor goods is located in Gersthofen, north of Augsburg. It offers a broad product range comprising 54 brands on a floor space of more than 3,500 sqm. "We don't just want to offer merchandise to our customers, we want to give them a

chance to experience it," says Karl Philipp Laber, Managing Director of Spiel + Freizeit Handels-Beteiligungs-GmbH. This includes events like the Star Wars Activity Day, the Tamiya Fighter Cup, Lego construction competitions, schoolbag parties and Playmobil spectacles, to name only a few.

Left: By the end of 2024 the drugstore company Rossmann will have equipped some 1,000 of its stores with SCO terminals for a total of 2,500 units

Below: Self-checkout at VEDES: A large touchscreen guides customers through the intuitive recording and payment process

Right: Book retailer Thalia has equipped more than half of its stores in German-speaking countries with SCO stations

Photo: VEDES



Photo: Thalia

And now customers can look forward to a new experience when leaving the store. This autumn, Karl Philipp Laber will inaugurate a self-checkout zone with two self-service checkout stations. Laber is a member of a project group consisting of three VEDES retailers and experts from VEDES headquarters in Nuremberg. Their purpose is to test and evaluate self-checkout systems in stores for games and toys. The team is thus doing pioneering work for the entire corporate group. VEDES AG, which is organised as a cooperative, functions as a service platform for some 700 independent businesses with about 900 toy stores.

UNSTAFFED VEDES SHOP One such business can be found in the Munich airport, where retailer Bernd Stocker is operating a “conventional” toy store and, since late March 2024, also an autonomous store that has no employees. The shop, called VEDES Scan & Go, is located beyond the security check in the departure area of Terminal 2 and has a sales area of 50 sqm. The product assortment is geared to travellers with children and to travelling parents who want to take along a present for their

offspring. A monitor at the entrance explains how the shop works. At the checkout there are scanners, a card reader and a large touchscreen that guides customers through the intuitive recording and payment process. If a customer nevertheless needs help, he or she can request it by pressing a button on the display. An employee at the nearby main store will answer. The main store also resupplies the shop.

“The shop is drawing considerable attention in the retail scene, and of course especially from our retail partners,” says Timo Weigert, Head of IT and the Digital Team at VEDES headquarters and a member of the SCO project group. The same is true for the system to be installed in Karl Philipp Laber’s store in Gersthofen. Like many other businesses, toy retailers have problems with a personnel shortages. For this reason alone, Weigert expects that other VEDES partners will follow suit (see interview in box).

DYNAMIC GROWTH According to an EHI survey, self-checkout terminals were installed in a total of 4,270 German retail stores as of late August 2023. This figure has probably risen considerably since then. Three fifths (61 percent) of these stores are in the food sector and 15 percent in the DIY sector and drugstore sector respectively.

In other retail sectors self-checkouts have been installed only sporadically. The exception is Ikea, which has provided self-checkouts in all of its stores

for many years already. Thus it was something of a surprise to learn that a company from the book trade was among the leaders in SCO installations for 2023/2024. But as a matter of fact, book retailer Thalia, with a century-old tradition and roughly 500 stores in the German-speaking region, last year set up some 430 self-service pay stations in 220 of its locations.

The remarkable thing was not only the number of systems installed, but also the timeline which the

company set for itself. Thalia made a basic decision for SCO in the summer of 2022.

In February 2023, after selecting service providers for hardware (Diebold Nixdorf), Software (GK) and furniture (made in-house) Thalia launched pilot projects in three bookstores. These were representative of the company's different locations and store sizes. Following three weeks of evaluation, a decision was made in March 2023, just in time for Easter sales, to roll out SCO systems in 50 other bookstores. "The pilot systems ran smoothly," says Stephanie Spurzem, Head of Sales Support at Thalia. The rollouts continued at the same pace in 2024. Systems are now also being installed in Switzerland and Austria.



Marcin Stańko
Operations Director
Pepco

“Universally appreciated”

Marcin Stańko, Operations Director for the Polish fashion discounter Pepco, on experiences with self-checkouts in Europe.

How are SCO terminals being accepted by German customers?

Our experience is positive. Customers are very willing to take advantage of this convenient option. They appreciate the opportunity to shop more quickly, especially when store traffic is heavy. As a retail chain we're satisfied with the operation of SCO systems and plan to add more.

Pepco has a presence in 18 countries. Are there differences among them in acceptance of SCO systems?

We're currently testing this solution in Germany and seven other European countries – in Poland, the Czech Republic, Slovakia, Spain, Italy, Greece and Portugal. The convenience and efficiency offered by self-checkouts are universally appreciated, which shows that this trend goes beyond cultural and regional differences. (Mz)

RFID FOR FASHION In the above-mentioned EHI survey of August 2023, toy retailers and book retailers were still listed under “other sectors”. In the case of fashion and sporting goods, the proportion of stores with SCO systems came to five percent, or some 230 outlets. Roughly one third of these were operated by Decathlon. This French retailer introduced its first self-checkout terminals in its more than 80 German outlets already seven years ago. The reason was Decathlon's emphasis on house brands. Accounting for 80 percent of the merchandise assortment, items with these brands are given RFID tags already when produced. The other products are labelled in the store. As a result, all items sold by Decathlon have RFID tags.

In the fashion sector, RFID technology is generally used for effective merchandise management, but it also offers an interesting alternative for self-checkout. That is because it records articles automatically, whereas with barcode each article has to be scanned individually. Decathlon's customers put their items into a box at the checkout, where they are identified by an RFID reader. Separate hand scanning of RFID tags is required only for items that don't fit in the box.

VERTICALLY STRUCTURED RETAILERS TAKE THE LEAD

Another retailer planning to use RFID for self-checkout is C&A. In September 2019 the company launched its first self-checkout zone in its fashion store in Solingen. Today customers can record their own purchases in more than 80 C&A stores throughout Europe. So far, they must use conventional barcode scanning and pay by non-cash means at the terminal. “The SCO usage rate is at



Above: At Decathlon transactions are handled by self-checkouts with RFID readers
Right: Uniqlo has installed SCO zones in all of its German stores



Fotos (2) EHI

16 percent across all countries, and for Germany it's much higher," reports Jochen Probst of C&A Services. Probst expects that the planned switch to RFID "will considerably simplify the process for customers and lead to even greater acceptance."

When it comes to self-checkout, a lot is happening in the fashion sector. Whereas the transition is slower in multi-label stores that put an emphasis on customer assistance and the shopping experience, it is much speedier in vertically structured retailers that put a focus on the lower price segment. For example, Uniqlo has installed SCO zones in all of its stores in Germany. Polish fashion discounter Pepco currently offers self-checkouts in 49 of its 63 German stores. With some 3,500 outlets in 18 countries, Pepco is a giant among retail enterprises. "Most newly opened stores will be equipped with SCO terminals," says Marcin Stańko, Operations Director at Pepco. The H&M Group is likewise investing in self-checkout terminals. Its customers can currently pay in this way at more than 30 stores in Germany. The H&M megastore in Munich, which opened in November 2023, has 12 self-checkout terminals.

INVESTMENT BY DRUGSTORES In the drugstore sector self-checkout activities are especially prominent at dm-drogerie markt and Rossmann. In late 2023 dm had 250 stores with SCO stations. Additional stations will be installed in the current year, and other stores are in line for this additional service. "We see self-checkouts as a bonus not only for

our customers, but also for our teams," says Mario Bertsch, Head of Marketing + Digital Business at dm. "The systems provide relief at peak times and are especially practical for small purchases."

Rossmann ran its first test in a local convenience shop in January 2017. Today it is pursuing a dual-vendor strategy with pure self-service stations and modular hardware variants from two manufacturers (Toshiba, Combase). These variants can be configured for many different locations, from convenience shops and city-centre stores to power stores and shopping centres.

In late 2023 some 580 Rossmann stores in Germany were equipped with SCO terminals, about a quarter of the total. The usage rate is 25 percent on average and more than 50 percent at peak times. "In view of this high level of acceptance, we'll be continuing to roll out SCOs," says Rossmann's product owner for SCO, Lea Winkelmann. By the end of 2024 Rossmann will have equipped some 1,000 of its stores for a total of 2,500 SCO terminals.

DIY STORES AT THE VERY TOP In terms of absolute numbers, the food retail sector has far and away the most self-checkouts in Germany. However, relative to the total number of stores, the DIY sector is a clear leader. SCO terminals can be found in more than one third of the roughly 2,000 DIY stores in Germany (including the DIY departments of self-service hypermarkets). This sector therefore has the highest density of SCO systems. Market leader OBI, for example, has SCO terminals in all of its 278

self-managed stores. Many of the other roughly 70 OBI stores operated by franchise partners can be expected to follow suit eventually.

Self-checkouts are also common in the branch stores of other leading enterprises. For a number of years, Bauhaus has had SCO terminals in all of its approximately 160 stores in Germany, with an

average of two to four per location. Hornbach has likewise equipped almost all of its roughly 100 DIY and garden centres in Germany with SCO systems. Rewe subsidiary Toom has so far installed four SCOs in more than 80 of its stores. “This year other locations will follow, and we’re also giving attention to scan & go,” says Toom spokesperson Daria Ezazi. ■

“Still in the discovery phase”

Timo Weigert, Head of the Digital Team at VEDES headquarters in Nuremberg, on self-checkout in retail for toys, games and recreation.



Timo Weigert
Head of the Digital Team
VEDES

What role does VEDES headquarters play in the SCO project group?

We support the projects, contribute our expertise and give financial assistance. For example, we added the necessary self-service functionalities to our IPOS checkout application for the Munich Scan & Go shop of our retail partner Bernd Stocker and helped to select a service partner, in this case Pyramid Computer GmbH, for the hardware.

Does the system work?

It works perfectly. Customers have no problems with it. The only item left on our to-do list is to add some language options for the text on the touchscreen, which up to now is only in English.

How is the Munich shop being used? What have you learned so far?

Our retail partner Bernd Stocker says that customer acceptance has been very satisfactory. Here the context of this particular location is important. The shop is in an area of Terminal 2 that only has travellers waiting for a flight.

Are there problems with theft?

This location has the advantage that all of the travellers have already passed through airport security. No one could steal something like a “normal” thief and then sneak away. What’s more, four video cameras are installed in the shop and the images are shown live in a four-part display. All of this creates psychological barriers.

Could the project be a blueprint for other unstaffed shops?

We must continue our evaluation and then reach a conclusion. I’m sure there are a number of comparable locations where VEDES Scan & Go could work.

And what about classic self-checkouts in conventional toy stores?

In this sector we’re still in the discovery phase. The initial tests are still running. Personally, I think that we can look forward to many SCO systems in retail for toys, games and recreation.



At SCO, transaction count is key for retailers

Consumers' shopping habits are changing, and so are checkouts: digital payment methods are clearly on the rise. But is this true for all purchases, all consumer types – and for self-checkout (SCO)?

The GLORY PAYMENT REPORT 2024 with the Bonsai consumer study shows that despite the increase in cashless payments, a significant number of customers still prefer cash. Especially for smaller amounts, where the simplicity and immediacy of cash payments is unrivalled – and also at the SCO. The ability to choose how purchases are processed and paid for is a key factor in customer satisfaction.

In terms of the number of transactions, cash remains the dominant payment method. Unfortunately, some checkout concepts underestimate the importance of cash at the SCO, resulting in a frustrating experi-

ence or driving customers to the staffed checkout.

This could explain why the success of SCOs falls short of retailers' expectations. The criterion should therefore be the number of transactions, not the amount of sales.

This shows the value of hybrid checkout concepts: a checkout experience that is operated by or at the SCO and supports cash, mobile and card payments is more likely to be accepted and appreciated. Retailers should ensure that their checkout solutions are efficient, flexible and secure. Cash management solutions, such as GLO- RY's CASHINFINITY™ range, can help

by automating cash transactions to increase the efficiency and security of cash management. At the SCO in particular, automated cash processing allows customers' demands for hybrid checkout models to be met without compromise.



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Variety is the spice of non-food retail

Self-checkouts are well established in non-food retail. Whereas the terminals in most sectors emphasise functionality and high throughput, in sporting goods and fashion the focus is on individual, design-oriented self-service solutions.



Thalia bookstore

Photo: Thalia



Rossmann drugstore

Photo: Dirk Rossmann GmbH



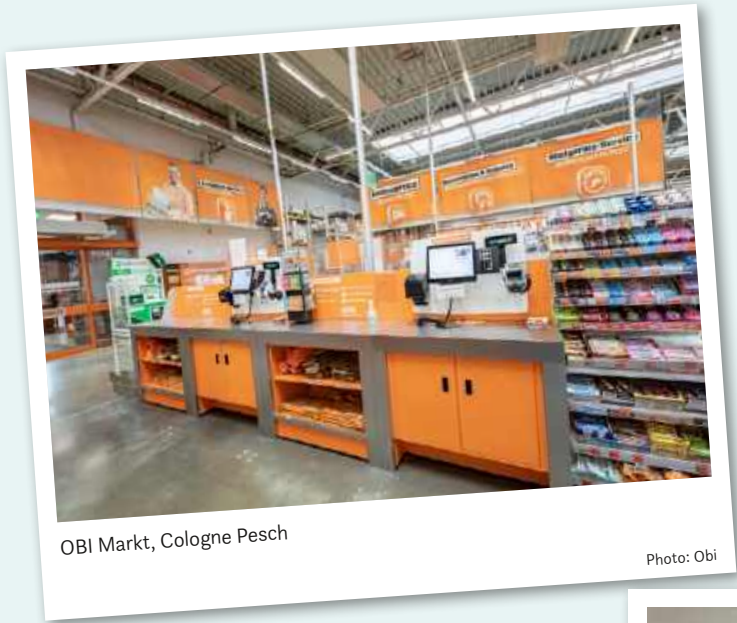
dm-drogerie markt

Photo: dm



Decathlon, Cologne Marsdorf

Photo: EHI



OBI Markt, Cologne Pesch

Photo: Obi



BayWa, Altötting

Photo: Wanzl



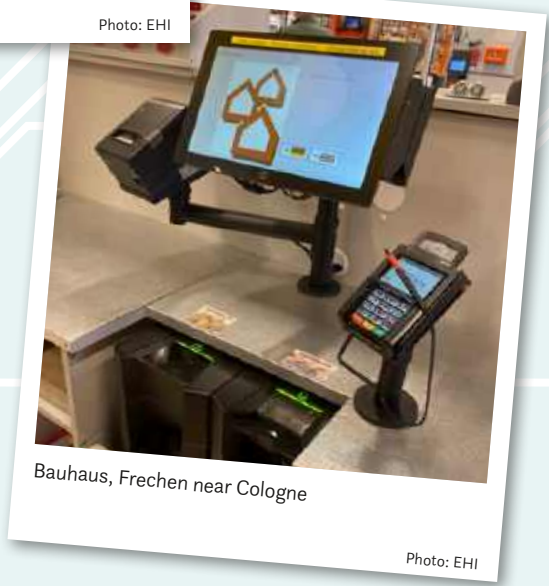
Uniqlo, Cologne

Photo: EHI



Ikea, Cologne

Photo: EHI



Bauhaus, Frechen near Cologne

Photo: EHI



Ikea Shop&Go

Photo: Ikea



Galeria, Frankfurt

Photo: Bütema



Zara, Cologne

Photo: EHI



Bershka, Cologne



Bershka, Cologne

Photos (2): EHI



C&A, Hamburg

Photo: C&A



Pepco, Berlin

Photo: EHI



Zara, Paris Champs Elysees

Photo: Zara



Armani Beauty

Photo: Payfree



VEDES, Munich

Photo: VEDES



Hema, Alkmaar

Photo: EHI



H&M Flagship Store, Munich

Photo: H&M

Goodbye to staffed checkouts?

Since mid-May 2024, Ikea Düsseldorf has been testing a new concept based entirely on self-service checkouts. This is Ikea's response to changing customer payment behaviour. Dirk Rummel, Payments and Checkouts Leader at Ikea Germany, explains the background and what the test in Düsseldorf means for the other 53 stores in Germany.

The interview was conducted by Frank Horst and Winfried Lambertz



Dirk Rummel
Payments and Checkouts Leader
at Ikea Germany

Photo: Steffen Hauser

Mr Rummel, Ikea Germany is a pioneer in the use of self-scanning systems. Looking back, what were the key milestones in implementing the new system?

Rummel: The retail sector is facing a lot of change, with customers' needs and expectations changing rapidly and constantly. At Ikea, we're always working to make sure our services match what our customers need. This also means trying out new things. Back in 2008, Ikea was one of the first retailers to start using self-service checkouts in addition to the usual ones. This change cut down the time people had to wait in line at the checkout, and also enabled us to give our customers a better experience. We first tried out mobile self-scanning in 2019. Shop & Go was first launched as an independent app, but was then integrated into the Ikea app in 2022. As of today, our customers can pay at self-service checkouts in all 54 Ikea stores in Germany using the Ikea app or at the familiar self-checkout.

How many people use Shop & Go at Ikea compared to other payment methods?

Rummel: Over 65 percent of all Ikea customers already use the self-service payment options, including Shop & Go and the express checkouts for self-scanning. Our customers tell us that it is very intuitive and fun to use. With self-service

payment options, we can cut down on checkout wait times and free up more of our time to help customers.

Which areas at Ikea have self-scanning systems?

Rummel: As well as the express checkouts in the checkout zone, there are more self-service checkouts in the showroom, the food kiosks, the terminals for purchasing gift cards and the self-checkout applications in the Sweden Shop and restaurants.

If we just look at the checkout zone, how many people use the self-checkout tills at Ikea and what's the sales figure?

Rummel: Ikea furnishing stores have an average of 60 to 70 checkout counters. Over 65 percent of Ikea customers already use our self-service payment options.

The Ikea furnishing store in Düsseldorf has been using self-checkouts exclusively for several weeks now. Can you tell us how this came to be?

Rummel: We've made these changes because customers are paying in different ways these days. More and more people want contactless payment options and self-service checkouts. Only 15 percent of our customers still pay with cash at our conventional checkouts. We're running a trial in Düsseldorf to see if we can speed up our checkout processes

Photos (2): Inter IKEA Systems B.V.



All scanning and payment processes are done through self-service checkouts at the Ikea store in Düsseldorf. The pilot project started in May 2024

and reduce waiting times for customers. The idea is to test out a new concept that relies exclusively on self-service checkouts.

But customers can still pay in cash or with a card if they want to. We will also continue to deploy our trained Ikea employees to provide support in the checkout area.

What does a self-checkout zone without staffed checkouts look like at Ikea?

Rummel: The new checkout setup in Düsseldorf means that customers scan and pay for their items exclusively via self-service checkouts. This is already the case in other Ikea countries such as Portugal and France, which also rely 100 percent on self-service. So, all the usual checkout points have been taken out and replaced with larger self-service zones.

Some areas only accept card payments, but this is the first time there are also self-service checkouts that accept both card and cash. In addition to the classic self-checkout tills, there are fast tracks for customers who want to pay

IKEA GERMANY

Kickoff 50 years ago

In October 1974, Ikea opened its first German store in Eching near Munich. Today, Ikea has 54 furnishing stores and eight planning studios and employs around 19,500 people in Germany. The company estimates its annual turnover for the 2023 financial year (1 September 2022 – 31 August 2023) at EUR 6.439bn. The company is part of INGKA Holding B.V., headquartered in Leiden in the Netherlands, while the German administrative headquarters are located in Hofheim/Taunus.

www.ikea.de



Photos (2): Inter IKEA Systems B.V.



Left: Around two thirds of Ikea customers use the self-services payment options

Right: Mobile self-scanning with the Ikea app

using the Ikea app. Shop & Go zones are a central element of the pilot concept.

So we won't be seeing the traditional long checkout line at Ikea in future?

Rummel: We are currently testing these new options at Ikea Düsseldorf. We will then see what happens and decide whether or to what extent we can roll out the setup to other furnishing stores in Germany.

How can the efficiency gains from switching to self-scanning be quantified?

Rummel: If we look at Düsseldorf as an example, we can say that we can fit around 20 percent more checkout counters in the same space. More checkout counters in the same space lead to greater efficiency. The key factor is that customers can save a lot of time at the checkout if they scan their items in the Ikea app via Shop & Go while shopping. The classic self-checkout without an app means that two thirds of the process is spent scanning, with only one third spent on the payment process.

This new setup is more relaxed for our checkout staff, which means they can give our customers more tailored advice.

The self-checkout zones in Ikea stores have an open design. If self-checkout tills are used exclusively in the future, wouldn't it make sense to have additional security measures in the form of exit gates?

Rummel: From what we've seen, customers scan the items in their shopping carts pretty carefully and thoroughly. We have not noticed any significant inventory differences since we introduced self-service checkouts. We've started testing out some new intelligent exit gates at our Ikea store in Düsseldorf. Instead of scanning your receipt to open the gate, the sensors will detect when you've paid and open it for you as soon as you approach.

As far as staff deployment is concerned, how many self-checkout tills are staffed?

Rummel: The new checkout setup should allow us use our resources to open a lot more checkouts in the future and serve them more efficiently. The aim of the new setup is to reduce waiting times at the checkout to a minimum. We will continue to deploy trained staff in the checkout area and in customer service as required. We expect our test run at Ikea Düsseldorf to provide us with valuable insights into the best ratio of customers to staff during self-checkout.

How does Ikea Germany compare internationally in terms of self-checkout?

Rummel: In terms of the self-checkout share, we are in the top third. Take Portugal, for instance. Ikea stores there have been using self-checkout systems exclusively for years. Given what we've learned from these other countries, it makes sense to test the setup for Germany too.

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*IDC POS Printer Market Appraisal Western Europe CY 2022, 2022 shipments, published May 2023

EPSON®



Photos (2): My Enso

Growing interest in low-tech concepts

Smart stores, autonomous stores, walk-in stores: there's been a lot of talk recently about a new kind of retail format that doesn't use cash registers or a lot of staff. While 24/7 mini supermarkets with self-checkouts are popping up all over, especially in rural areas, a roll-out of fully autonomous grab-and-go stores still seems a long way off.

There are a few reasons why retailers are looking into fully or semi-autonomous small store concepts. For one, it can lead to increased sales because the store isn't tied to opening hours. It can also help optimise services for local shoppers in rural areas where there's a shortage of staff. There is a wide range of concepts on the market: the Baden-Württemberg Cooperative State University (DHBW) in Heilbronn has come up with two different types

of smart stores: "walk-in" and "automated boxes", the latter of which doesn't have direct access to the goods. The biggest group of walk-in formats are the mini-markets with minimal staffing, self-checkouts or smartphone scanning. They are a handy local resource, especially in areas where there are structural weaknesses, and are usually accessible 24/7.

The most technologically advanced variant is the autonomous grab-and-go store. AI technology,

Left: Tante Enso's mini grocery stores are local suppliers in northern Germany and are open around the clock. Outside staffed hours, customers can get in electronically with their customer card.

Below: At Tante Enso, payment is made at the self-checkout with a customer card

Right: In the fully autonomous Rewe Pick&Go store, customers pay without scanning



Photo: Rewe



Photo: Michael Breuer Photo concept

computer vision and weight sensors register every item taken from the shelves and assign it to the person shopping. At the end of the shopping trip, the customer leaves the store without actively paying. Once purchases are made, the amount is taken from the customer's account automatically through the app. Grab and go technology is still being tested in Germany. As of August 2024, there were 17 grab-and-go stores up and running in Germany. The operators are the Rewe Group, Edeka with Netto, Tegut, Deutsche Bahn, Hoody, Q1 and Zabka.

SCANLESS WITHOUT REGISTRATION The best-known example is Rewe's Pick & Go supermarkets, of which there are currently six in Berlin, Düsseldorf, Hamburg, Cologne and Munich. Some of these are hybrid stores with additional staffed checkouts. In Rewe's second Hamburg test store, which opened in August 2024, customers can choose between four different payment options. Rewe's technology partner is Trigo Vision, who are experts in computer vision and AI.

The trend is for grab-and-go stores to let customers in without having to register their app at the entrance. This is because retailers have realised that having to register at the entrance is a barrier for many people who want to use the store. Rewe and Netto are also trying to reduce access barriers and offer scanning-free shopping without registration.

Given the hefty investment costs, rolling out grab-and-go concepts across the board is not yet an option. But smart stores with 24/7 self-scanning technology are a different story. The latest stats from DHBW Heilbronn show that these stores already had 134 points of sale in Germany by August 2024. Mini-markets are expanding primarily in structurally weak rural regions. "This is mainly because 24/7 smart stores can fill supply gaps in rural regions, and there are fewer traditional stores to compete with," says Professor Stephan Rüschen from DHBW Heilbronn (see interview). Another reason for the quick growth is that these shops are laid out in a way that's much simpler than the grab-and-go stores, which makes it easier to expand

Photo: EHI



Above: The Nahkauf Box is a smart store format for independent Rewe retailers. Supply is ensured from the core business

Left: Self-checkout at Tante M: Simple desk solution with desktop touchscreen and payment terminal



Photo: Rewe

the format. In addition, there are really no e-food options in rural areas.

THREE MARKET-LEADING PROVIDERS Three market-leading providers have emerged in the 24/7 smart store segment with self-scanning technology:

- **TANTE M** The local convenience stores with locations in Baden-Württemberg and Rhineland-Palatinate do not have access control. Access is unrestricted during opening hours. The goods are sourced from local food wholesalers, while fresh produce such as fruit and vegetables, meat

or bread and baked goods come from regional producers. The self-scanning checkout is a simple table-top solution with a desktop touchscreen and payment terminal for Girocard, credit card and rechargeable customer card. Payment cannot be made by cash. Only the centrally maintained items from the dry goods range and drinks can be scanned; the prices of loose fresh goods products usually have to be entered manually by customers at the self-service checkout. The operator of the current 55 Tante M stores, most of which are run by franchisees, is an entrepreneur from the Swabian town of Pliezhausen.

- **TANTE ENSO** The northern German equivalent of Tante M launched as an online supermarket in Bremen back in 2018 and opened its first bricks-and-mortar store in the same year. There are currently 50 mini grocery stores (as of August 2024), which stock a full range of products for daily needs and are open around the clock every day of the week. On weekdays, they are usually staffed for three to four hours; outside of these hours, customers can get in electronically with their My Enso customer card. The customer card is also used to pay at the self-checkout. Tante Enso is based on the Enso E-Commerce GmbH cooperative model from Bremen. On average, 40 to 60 percent of the village population are co-owners of a store through the purchase of share certificates. The average investment for store design and technical equipment is between EUR 200,000 and

The compact self-checkout terminals in the Nahkauf Box only accept card payments

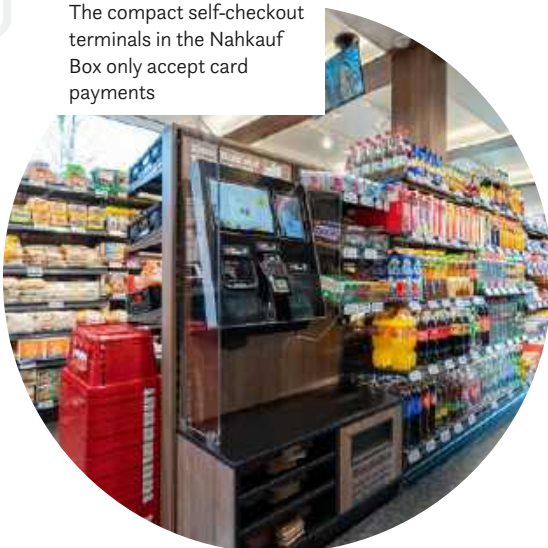


Photo: Rewe

250,000, of which at least EUR 30,000 is financed by the cooperative model.

- **TEO** The Teo 24/7 Smart Stores with their eye-catching wagon look were launched in 2020 by the food retail chain Tegut. They are now managed as an independent division of Smart Retail Solutions under the umbrella of Tegut owner Migros. Most of the 40 Teo stores are located in urban areas. Consumers can get into the store using an app or a bank card. Items are scanned and paid for using the Scan & Go app or at the self-checkout.

The first fully autonomous Teo with cashless checkout opened in Darmstadt almost a year ago. Smart Retail Solutions has announced that it will soon be opening a second fully autonomous Grab & Go store in Marburg. The technology partner is Autonomo Technologies.



At teo 24/7 Smart Stores, items are registered and paid for using the scan & go app or at the SCO

Photo: Smart Retail Solutions

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In addition to Teo, there are other “low-tech” smart stores operated by grocery chains. Examples: Georg Jos. Kaes from southern Bavaria has been successful with its “v-mini” small store concept. All are operated without staff and exclusively with exit gates. The Rewe Group has been offering a smart store format without complex AI technology for two years now with its Nahkauf Box. The idea is for independent Rewe retailers who make sure they can keep their small spaces stocked, maintained and cared for as part of their main business. The compact self-checkout tills in the current eight Nahkauf-Box containers are from 4POS and only accept card payments.

The main challenge for operators of these store formats is combining the convenience benefits of being open 24/7 while protecting against theft and vandalism. Camera surveillance is therefore just as

much a standard feature as electronic access control. The operator also prevents theft and vandalism by not accepting cash payments, hiring security staff and not selling items that are particularly at risk of being taken.

More and more 24/7 stores are opening up because they bring benefits to local communities and people are happy to have them there. The amount of money needed to invest in the right technical equipment for the mini-shops is manageable. The fully autonomous 24/7 formats will remain test stores for the time being. There is still a long way to go before the high development costs are amortised. (Lz) ■

“Scalable to the smallest of spaces”



Professor Stephan Rüschen
Cooperative State University
Baden-Württemberg Heilbronn

Stephan Rüschen, professor of food retailing at DHBW in Heilbronn, believes it is only a matter of time before grab-and-go technology breaks through.

In Germany, 24/7 smart stores are niche but booming. How do we compare internationally?

In Germany, there are well over 100 various store concepts that fall under the 24/7 smart store umbrella. The variety here is much higher than in other European countries. However, in Germany the focus is on self-scanning concept stores and dispensing machines with robotics-like technology.

Hybrid stores with additional staffed checkouts and SCO for service times and unstaffed opening hours – a model for the future?

Definitely. On the one hand, retailers are struggling to find staff, and on the other hand, they’re looking to extend their opening hours.

Fully autonomous grab-and-go stores are still in the testing phase. Do you think this format is scalable?

The format is scalable. I expect that we will see a breakthrough in smaller convenience stores over the next few years. Before retailers start a roll-out, they will need to have a solid business case based on several test stores. I’m sceptical about the larger supermarkets, for example those with 1,000 sqm or more.

What’s the outlook for supply? Will we still have a mix of self-scanning technologies in ten years’ time?

Yes, I think there’s a good reason for every system and that they each solve different use cases. There could be even greater variety in the future.



New RFID potentials for checkout and more

Anyone digitizing the checkout should take upstream and downstream processes into consideration. After all, the technological basis determines the benefits beyond the checkout – for customers and retailers alike.

Open store concepts, fewer queues, more interaction on the sales floor and efficient processes: These are the ingredients for an outstanding customer experience. Simple in theory, hard in practice. When modernizing retail space, new technologies need to be integrated into the store design, the spatial conditions and existing IT. This goes hand in hand with fundamental decisions, especially at the checkout. There is a choice between self-scan and autonomous systems. The former are easier to install but shift the cashier's work to the customer. The latter require high investments in AI, cameras, sensors and servers. At least until now. payfree now offers an alternative based on RFID: a flexible system that can be expanded step by step – with additional process benefits.

Radio Frequency Identification has long been standard in the textile trade. Other sectors are following suit with the further development of radio technology: Today, products of any size and material composition can be uniquely identified with RFID tags – even metals, liquids, fresh and refrigerated goods. This enables a smooth checkout, but also offers potential in incoming goods, inventory management, stocktaking and goods security.

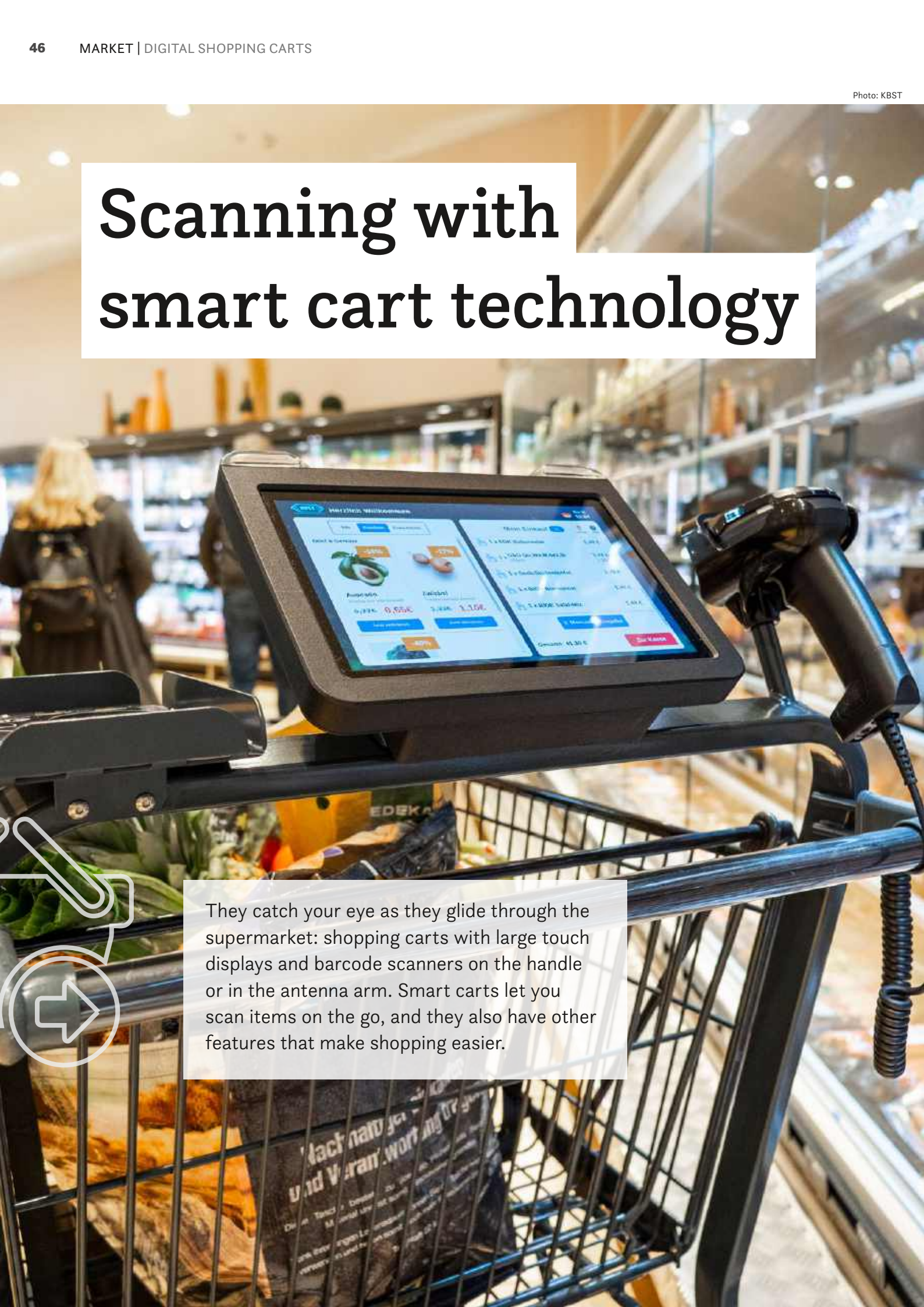
payfree builds on this versatility: The walkthrough specialist successfully uses RFID in the sports, merchandise, cosmetics and convenience sectors. Its automated product scan with payment option is now available as a modular hardware and software package: Individually configurable as a fast lane, box scan or desk solution, it fits

into any environment and can be combined and scaled as required. A comprehensive software suite ensures the connection of IT systems and offers smart additional applications for customers and employees that go far beyond the checkout.



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Scanning with smart cart technology



They catch your eye as they glide through the supermarket: shopping carts with large touch displays and barcode scanners on the handle or in the antenna arm. Smart carts let you scan items on the go, and they also have other features that make shopping easier.

“One of the reasons the Smart Shopper is so popular is that it’s anonymous.”

Robert Aschoff
Owner
Edeka Aschoff, Kassel



Edeka retailer Robert Aschoff currently has 40 digital shopping carts with Scan Box technology from the provider KBST in use at his store in Kassel

The microcomputer on the shopping cart was originally called the Personal Shopping Assistant. The first use of this technology was in 2003 at the Extra supermarket in Rheinberg, which was the site of a longer-term trial run by the Metro Group of some new in-store tech. The idea of customers scanning their purchases themselves with a small computer was a complete flop at the time. The time was simply not yet ripe.

Today, a good 20 years later, intelligent shopping carts are making a comeback. The rise of handheld devices and the growing use of smartphones for self-scanning have really lowered the bar for touchscreen computers at the shopping cart. Mobile self-scanning with handheld devices or smartphones is great, but the large touchscreens make it even better. The customer can see product names and prices easily as well as the shopping list created at home using the retailer app. Depending on the model, shoppers can also get things like advertising based on where they are in the store and their customer profile, product search, indoor navigation and recipe suggestions. The latest generation of displays even have an integrated payment function, so that customers can complete their purchase without having to go to a stationary point of sale.

Smart carts are great for customers because they make shopping trips more convenient and give retailers another way to connect with customers.

THE PROVIDERS There are currently two roll-outs of intelligent shopping carts in Germany: One is Smart Shopper, a joint development between technology start-up KBST from Kassel and Espresso Germany, a provider of transportation equipment, and the other is the Easy Shopper, a product from technology provider Pentland Firth. The Edeka regional company Minden-Hannover holds a majority stake in the Munich-based software start-up. The green Easy Shoppers, recognisable by the shelf for holding shopping bags or folding boxes and the antenna arm with lateral barcode scanner, are widely used in Edeka stores in the Minden-Hanover region. According to Pentland, there are currently (as of August 2024) almost 7,200 Easy Shoppers in 187 stores.

The Smart Shopper from KBST looks like a normal shopping cart at first glance, with a wire basket at the top and a shelf for crates of drinks at the bottom. As customers shop, they can scan the products they want using the hand scanner attached to the large display. This is the Scan Box. They can scan the products before putting them in the wire basket. Around 170 Edeka stores in six regional companies are now using the Smart Shopper or Scan Box, and KBST puts the number of shopping carts with the Scan Box at just over 3,200.

KBST showed off a prototype of a digital shopping cart that they developed in-house at EuroCIS 2024. The new Scan Cart, which is going to be tested at Edeka Aschoff in Kassel this autumn, works on the same principle as the Smart Shopper, which can still be ordered from Espresso Germany. Both products have a precise checkweigher and can be optionally retrofitted with a camera.

Left: The big touchscreen on the shopping cart lets you see the product name, price and any special offers easily.



Left: The lateral antenna arm with integrated barcode scanner and control camera is a distinguishing feature of the Easy Shopper

Above: Pay in the Easy Shopper app

Right: The shopping carts' microcomputers are charged with electricity in air-conditioned parking boxes

SECURITY TECHNOLOGIES It's the integrated security tech that makes the intelligent shopping carts really smart. It's not possible to completely eliminate the risk of lost goods due to forgotten or deliberately omitted scans, which is a weakness of conventional self-scanning solutions. However, digital shopping carts can help to significantly reduce this risk.

Three different security technologies are currently in use or still being tested:

- Photo and video cameras that monitor the purchasing process
- Weighing sensors built into the shopping cart that register weight changes in the shopping basket after the scanning process and
- Cameras as a platform for image recognition in conjunction with computer vision and artificial intelligence.

Smart Shopper and Scan Cart from KBST are equipped with sophisticated weighing technology. Three load cells connected to sensors in the body of the shopping cart constantly check the contents of the wire basket and the items on the lower level during the shopping process by comparing the weighing data with the weight values stored in the item master data. The algorithm developed by KBST learns the weight of all items during customer use fully automatically and without any intervention by the retailer. If the customer places an item in the shopping cart without scanning it first or subsequently places a different item than the one previously scanned, a warning signal indicates the error and prompts the customer to correct it.

Pentland explains that the integrated load cells in the Easy Shopper also measure the weight difference each time a customer adds an item to the cart. A control camera in the antenna arm aligned with the basket records image and video information,



The basic facts about digital shopping carts:

- Smart shopping carts have a touch computer with an integrated or wired barcode scanner
- The touch displays show the item name and price as well as advertising messages
- Shopping list and personalised advertising can be uploaded via an app connection to the customer's smartphone
- Integrated security technologies are designed to prevent items from being placed in the trolley without being scanned
- Smart Carts are currently in use in around 360 supermarkets of the Edeka cooperatives.

Customers register items while they shop in the Scan Box with display and connected hand-held scanner

Foto: Pentland Firth



Photo: KBST

while another camera is attached to the lower shelf. With a store manager app, store staff or store detectives can carry out live checks using the control cameras and monitor the shopping process in the event of discrepancies.

The Scan Box 2.0, the second generation of the tablet computer from KBST, has a camera integrated into the display. If there are any issues, like if an unscanned item has been added to the basket, a short video is recorded and shown to the customer on the display. The customer then has the option of correcting the error. If an error is not corrected, the person is checked at the checkout. Age verification also takes place there.

There is also a “light version” of Pentland’s Easy Shopper with a normal shopping basket instead of a packing shelf. The look is similar to that of a normal shopping cart. Variants without weighing technology are also available from KBST and sales partner Expresso Germany. According to the provider, the Scan Box and Scan Box 2.0 display modules can be retrofitted to any standard shopping cart. Retailers can also upgrade the shopping cart at a later date if they want to install theft prevention with load cells.

AI AND COMPUTER VISION Smart shopping carts that use artificial intelligence and computer vision to recognise products are still at the testing stage. The principle: a camera in the display unit on the

shopping cart scans the barcode of the selected item and adds it to the shopping basket after matching it with the optical item parameters learned by the AI. For example, the camera recognises whether a different bottle of wine has been placed in the shopping cart than the one previously scanned and put back on the shelf. All actions are displayed as a live image on the screen.

Wanzl, the top global shopping cart company, is launching a Smart Trolley with AI software for goods registration at the end of 2025. All customers have to do is scan the barcode with the rear camera, and the AI software will instantly check if the item scanned matches the product they added to their cart. “This tech makes it simple to spot when someone’s tried to tamper with the system. For instance, if a cheap item has been scanned but pricier goods have gone in the cart, or if several identical items have been added but only one scanned,” says Wanzl. Wanzl plans to launch a smart shopping cart with a barcode scanner without AI and computer vision as early as the turn of 2024/2025.

The solution from Berlin-based technology start-up Nomitri uses the camera of a standard tablet PC to operate the security system. It registers the barcode and tracks the action in the shopping basket. The technology is fully integrated into the tablet and, according to Nomitri, works without a server connection. Test runs have been carried out



The smart shopping cart from Wanzl should be available for use in retail at the turn of 2024/25

Photo: Wanzl

in several Edeka Lünig supermarkets and, more recently, in Crai supermarkets in Italy.

So far, all these solutions have used a barcode as the visual marker for product identification. We've already seen some early user experiences with smart trolleys that work exclusively with image recognition, without barcode scanning. In 2023, the southern German Edeka retailer Hieber ran a pilot project with the Israeli start-up Flow. They used Flow Carts with automatic image recognition in their Grenzach store for a few months. Edeka didn't pursue the solution after the test was done, but Norbert Schoeffel, Managing Partner of Hieber's Frische Center KG, thinks image recognition on shopping carts will eventually take off. "The technology works. I think there's definitely potential in small areas with a limited product range." Max Aschoff, who co-founded KBST, isn't convinced about the near future of camera recognition. "In large-scale food retail with 45,000 items, for example, it is practically impossible to train software in such a way that a camera recognises all products with sufficient certainty."

With the solution from Berlin-based technology start-up Nomitri, the camera on a tablet PC reads the item barcode and tracks the action in the shopping basket

REGISTER AND PAY Customers who choose "Easy Shopper" can register either through the app or by using the Deutschlandcard. Smart Shopper and Scan Cart from KBST can also be used without prior authorisation. Once the customer has finished shopping they just hit the pay button on the display and choose their payment option. Checkout takes place at staffed checkouts or at the self-checkout. There are often special self-scanning payment stations set up for use with the Smart Cart that can be accessed directly via a fast lane.

If a customer uses the retailer's own Scan & Go app, they can also pay directly in the app, so there's no need to go to a physical checkout. It will also soon be possible to make anonymous payments by card just like at a card terminal, using an NFC antenna that's built into the display.

The idea behind the intelligent shopping carts is not to replace normal shopping carts, but to provide an alternative, according to manufacturers. In view of the not inconsiderable investment costs for shopping carts with weighing electronics, the widespread use of smart carts is out of the question anyway. Suppliers recommend thinking about using them in stores with 1,000 sqm or more of sales space. Most stores start off with ten units and usually use about 20 smart carts. (Lz) ■



Photo: Nomitri



ScanBox and ScanCart – the shopping carts of tomorrow

Whether as a shopping experience, to relieve employees and the checkout area or as a platform for your own loyalty program - digital shopping carts offer the secure self-scanning solution for the retail of tomorrow thanks to numerous sensors.

Do you know this feeling? The weekly shop is coming up, little time, full checkouts and long queues. The stationary SCO checkout is no solution for a large purchase.

This feeling is part of everyday life for your customers. The shortage of skilled staff makes it almost impossible to open staffed checkouts, and uncontrolled self-scanning devices are not an option in the context of increasing theft.

The solution to this challenge is provided by digital shopping carts – equipped with a scanner, a large screen and numerous sensors for monitoring.

ScanBox 2.0 and ScanCart from KBST are the result of more than 7 years of experience in the field of digital shopping carts.

With over 3,000 devices in almost 200 stores in daily use at well-known

retailers such as EDEKA and Netto, they are already opening up the shopping experience of tomorrow.

As a modular system, KBST offers every store the right, individual solution: From retrofitting a classic shopping cart, to the use of high-precision weighing sensors in the ScanCart, to the use of camera technology, KBST meets all the challenges faced by retailers in their daily operations.

ScanBox 2.0 and ScanCart can be supplied with KBST's front-end software or used as a platform for the retailer's own Scan&Go app (Android).

The retailer thus has control over their own customer data, can use the large display for customer communication and offer all the benefits of their loyalty program during the purchase.

KBST's comprehensive backend software ensures the operation of the

devices and is included in the price. This includes a mobile device management system and over 1,500 settings for the daily operation of the shopping carts.

Available as a purchase model, KBST also guarantees a service life of at least 5 years at unbeatably low prices and without SaaS costs!



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Photo: ITAB

All checkouts as SCO terminals

Ingolf Schubert, who runs the Edeka store in Rostock town centre, has gone all in on SCO checkout terminals. Since the rollout of the system, there are no longer any queues and there has been a big boost in employee productivity.

Ingolf Schubert had the idea of completely converting his Edeka store in Rostock to self-checkouts after he realised that the existing concept with eight express checkouts no longer met the requirements. One of the main reasons for this was the different customer frequencies in the market. When tourists and passengers from cruise ships and excursion boats dock at Rostock's Baltic Sea port, the store had to respond by staffing all eight checkouts to quickly clear the queues. To make sure the checkouts were always fully staffed, store employees constantly had to be pulled out of other tasks. It also became clear over time that the store needed more than eight checkouts at peak times. Another argument is the well-known staffing problem. Ingolf

Schubert is also finding it increasingly difficult to recruit reliable staff for his six Edeka stores.

ALWAYS READY FOR ACTION The problems were solved by switching to self-checkout tills (ITAB Impuls SCO). Customers now scan their purchases themselves at twelve SCOs, arranged in three rows of four checkouts each. "Since then, there's been no more waiting in line and all twelve checkouts are always open for customers," says Schubert. A ceiling-mounted electronic checkout guidance system uses visual and audible signals to guide customers to the SCO checkout that is ready for use. Four of the twelve checkouts are only equipped with card terminals, the remaining eight also accept

Left: Twelve SCO tills in three rows: All terminals are available to customers at all times

Right: Edeka store operator Ingolf Schubert explains how the control terminal works and from where the scanning processes can be checked at each of the twelve checkouts

cash. “Customers expect to be able to pay in cash,” is Schubert’s assessment. Card payments account for 50 percent of sales at the Edeka store in Rostock.

Initially, customer acceptance was mixed, reports Schubert: “Some people were critical and accused us of cutting jobs.” The first few weeks after the changeover were spent helping and explaining.

INCREASED PRODUCTIVITY. “Since the introduction of the new checkout system, there has been a significant increase in productivity,” says Schubert. Two employees work permanently in the SCO area to support customers as required. Another person observes the scanning process at each SCO checkout in operation from a central workstation equipped with monitors. The control terminal (ITAB Attend Flow) is also used to check the age of purchasers of alcoholic beverages.



Photo: EHI

Looking back on the year and a half since the changeover, Schubert concludes: “The SCO concept is very well suited to this location, also because we have relatively small purchase amounts of six to eight euros on average.” The 1,200 sqm city centre store is located in a pedestrian zone in Rostock and has no customer parking. The Edeka retailer believes that only a combination of staffed checkouts and self-checkout would work in a traditional supermarket with larger baskets. In Waren, for example, Schubert operates an Edeka store with six SCOs and four staffed checkouts. ■

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connected in-store technologies, you can accelerate checkout times and reduce losses. Location-specific market analysis and data-driven models further enhance decision-making. Trust ITAB, your one-stop solution provider, to deliver intelligent and successful checkout concepts. We combine innovation, efficiency, and design to elevate the consumer brand experience.



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Photo: Diebold Nixdorf/Katrin Hengst

Flexible checkout platform

Fashion retailer C&A has been using self-checkout solutions since 2019, making it a pioneer in the industry. The redesigned store in Hamburg's Mönckebergstraße uses a semi-assisted solution that allows customers to quickly switch from attended to unattended mode.

In recent years, C&A has modernised many of its approximately 1,300 stores in Europe as part of a comprehensive transformation. An important element of this transformation is the introduction of modular self-checkout systems. First used at C&A in 2019, the company has since further developed

“One of the best features of the semi-assisted self-checkout solution is that it is highly flexible.”



Jochen Probst
Domain Lead Selling & Markets
at C&A

this innovative approach. It is now piloting the latest generation of self-service systems, the DN Series® Easy One from Diebold Nixdorf, in its newly designed store on Hamburg's Mönckebergstraße where customers have the option to pay at one of the nine self-checkout solutions. The unique feature of this solution is that it is a semi-assisted self-service system that can operate in both self-service and attended mode. Switching to attended mode, for example when customers want to pay in cash or exchange goods, is quick and easy as the system features two displays before the checkout process. The optimum operating mode depends primarily on the current customer frequency. Especially at peak times, customers can save a lot of time by using the self-checkout.

HIGH ACCEPTANCE “The semi-assisted self-checkout solution offers a high deal of flexibility, which is certainly one of its greatest advantages. This solu-

Left: Inviting design, with information about the checkout process that is easy for customers to understand: Scan & Go at C & A in Hamburg

Right: Switching from unattended to attended mode is simple and quick



Photo: Diebold Nixdorf/Katrin Hengst

tion also allows us to combine efficiency with the reliability of conventional checkouts from Diebold Nixdorf's Beetle series," says Jochen Probst, Domain Lead Selling & Markets at C&A. The new solutions are simple and intuitive to use. They have been very well received by customers, as evidenced by the transaction figures: 35 percent of customers already pay at the self-service checkout. This is also helped by the variety of payment options available, such as by credit card or contactless via smartphone or smartwatch. Vouchers or Payback points can also be redeemed.

"With our checkout platform, the checkout zone can be planned flexibly and individually. The modular hardware concept offers a wide range of

options: For example, it is possible to choose between dual-screen and single-screen versions and to add printers and other peripherals as needed. With these and other configuration and customising options, we offer a solution that can be tailored precisely to customers' specific requirements and store concepts," says Matt Redwood, VP Retail Technology Solutions at Diebold Nixdorf. C&A are happy with how the self-checkout solution is working out. The evaluations are looking good. ■

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Flexible checkout options

Diebold Nixdorf automates, digitises and transforms the way people shop.

As a reliable software, service and technology partner, we help our more than 150 retail partners worldwide to shape their brick-and-mortar opera-

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We design retail spaces with flexible checkout options that attract customers and encourage staff to focus on customer service. We make it easy for

retailers to use self-service tech because they don't have to stick with one hardware and software provider. Plus, we use AI to solve the biggest checkout problems, like shrinkage and system availability. Diebold Nixdorf has a presence in more than 100 countries, with around 21,000 employees.



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Photos (3): Zebra



Simply shop faster

Coop Switzerland has rolled out a new generation of handheld scanners for mobile scanning in supermarkets. The goal is to give customers the best possible experience while also saving them time when shopping.

Coop Switzerland is a consumer cooperative with companies in the food retail, wholesale and production sectors. The cooperative was set up in 1864 and has grown over time to become a group of companies operating across Europe. There are currently 2,429 Coop outlets in Switzerland alone. Coop has a total sales area of around 2.1m sqm, including supermarkets, hypermarkets (“Megastores”) and smaller department stores. If customers can’t make it to the store, the Coop online store is there to fill the gap.

Coop Switzerland launched a self-scanning system with handheld scanners and self-checkout tills back in 2005. In 2020, the company started moving over to the new PS20 Personal Shoppers from tech provider Zebra. The migration was completed in mid-2021. By the end of 2023, over 800 stores, or 90 percent of all Coop supermarkets in Switzerland, were equipped with the new generation of handheld scanners.

ROBUST AND EASY TO USE Pascal Dambach, Head of IT Processes Merchandise Management Sales at Coop Switzerland, explains why the company has renewed its self-scanning service. “We needed modern devices for a modern customer. Devices that are robust and easy to use.” We also needed a big, high-resolution display and a scanner that could read barcodes accurately, even from different angles and at a distance. Dambach says that how quickly the items are scanned and processed is a key factor. “The devices must be able to scan different items accurately and quickly, for example water multipacks, fresh produce and hard goods.”

It was crucial for Coop Switzerland to integrate the Passabene software they developed in-house into the new generation of handheld scanners. Pascal Dambach: “By migrating the Zebra hardware, we have harmonised the software on the devices with the software solutions in the POS area. We

Left page, left: Barcode scanning with the Personal Shopper right at the shelf
Left page, right: Important: precise and fast recognition of the barcode on the products
Right: The holder on the shopping cart means customers can keep an eye on the hand-held scanner at all times



have also made the same software available as a mobile app.” At Coop, customers can decide whether they want to use the handheld scanner or their smartphone for mobile scanning when shopping. Looking at how customers use the devices, what they buy and how much they spend gives us a good idea of what they want, which helps us decide on the best way to design the stores and create the right ad campaigns.

LIFE CYCLE SUPPORT Zetes Switzerland has a long-standing partnership with Coop. The company advises on the selection of suitable hardware and provides a wide range of services, including hardware consulting, commissioning, installation and hotline service. Zebra and Zetes also offer the retailer lifecycle support for the approximately 30,000 devices provided.

“It doesn’t matter whether customers use the app on their phone or the handheld scanners – they love the new shopping options,” says Pascal Dambach. The figures prove him right: Coop says that people using the self-scanning solution tend to buy more than those paying at staffed checkouts – on average, their shopping baskets are 3.5 times larger. ■

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Checkout-free shopping at Teo

From scan & go to grab & go: Tegut in Darmstadt is trialling one of the most cutting-edge checkout solutions in brick-and-mortar retail to date. The cameras and sensors in the Teo grab & go store can tell which items are taken from the shelves and automatically bill them.

“Our grab & go small format is the way forward in shopping – it’s convenient, efficient and available 24/7.”



Sören Gatzweiler
Manager
Smart Retail Solutions

The smart 24/7 stores with self-scanning technologies were launched in 2020 by the food retail chain Tegut. The current Teo store portfolio comprises around 40 stores in urban areas, with a few in rural locations too. The customer can get into the store using an app or a bank card. Items are scanned and paid for using the scan & go app or at the self-checkout.

AI-SUPPORTED AUTOMATION Smart Retail Solutions has been testing updated versions of the 24/7 format for several months. The young start-up operates the stores as a separate Migros company. The fully autonomous small store concept is a game-changer in the world of shopping. In the classic Teo store, you can scan and pay for your

items using the scan & go app or at the self-checkout. In the grab & go section, you just grab what you want and leave. No fuss! Thanks to computer vision, weight sensors on the shelves and machine learning, the AI can automatically recognise the items that have been selected. The checkout system puts all this info into a digital shopping cart and starts the payment process when the customer leaves the store.

Customers receive a digital receipt that can either be displayed directly in the app or retrieved by entering a code on the meinteo.com landing page. This AI-supported automation significantly minimises physical contact points in the customer journey and even eliminates the need for physical checkout areas, such as self-service checkouts.

Photo: Smart Retail Solution

Left: The Teo grab & go store offers a basic range for everyday needs in a compact space

Right: Just outside the entrance, there's a poster that explains how shopping at the grab & go store works

Far right: How do I get my shopping voucher? Customer information at the end of the purchasing process

Authorization takes place at the entrance with a credit card or via the Teo app.

One of the best things about this system is how it links up with the checkout system. It's frictionless, which makes shopping a breeze. Snabble, checkout solutions specialist for retail and a technology partner of Teo, is a key player here. Snabble is a checkout system that does more than just manage the shopping cart. It also handles fiscalisation, data processing and automatic payment processing in real time, including the issue of digital receipts. "What makes Snabble checkout special is that it supports all checkout variants after a one-off integration into the retailer's systems," says Sebastian Mancke, CEO and founder of Snabble GmbH in Bonn.



Photos (2): Smart Retail Solution

Sören Gatzweiler, who heads up Smart Retail, sees the fully automated store as a game-changer in the quest for a seamless shopping experience. "Our grab & go stores use cutting-edge tech to make shopping a breeze. Thanks to the seamless integration of computer vision technology and an innovative checkout system, our customers can shop around the clock without being tied to traditional checkouts." ■

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le the current challenges of the industry head-on and get ahead of the curve.



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www.snabble.io



Photos (2): Anker Solutions

Secure payment solution in the farm shop

In the Schreyer family's farm shop in Straubing, Bavaria, customers pay for their purchases at a self-service terminal. The new self-service checkout eliminates the need for time-consuming cash handling, optimising internal processes and increasing security in the farm shop.

Authentic, sustainable, honest – the farm shop sells individual farm produce instead of interchangeable mass-produced goods. Farm shopping is always an experience, as no two farm shops are the same. The products from the farm make each farm shop unique. The environment in which goods are sold and displayed can also make a farm shop unique.

The Schreyer family's farm shop started out as a small potato store. Five years ago, the family decided to expand the business and add new items to the range. Today there are around 800 products. As well as fruits and vegetables, meat and sausages, eggs, wine, spirits and other local products, the shop also sells some non-food items. The farm shop, which launched in 2020, is open seven days a week and has disabled access. On weekdays, customers

serve themselves from 7 a.m. to 9 p.m., while the store is staffed at weekends.

GOOD BYE TO CASH PAYMENT Running a farm shop comes with its own set of challenges. Buying and paying in the shop, which is open most of the time, is based on honesty and trust. Payment is usually made with coins and banknotes, which are deposited by customers in a more or less secure box. From day one the Schreyer family's farm shop also used a steel cassette, bolted to a base and secured against theft. However, as the product range grew, this payment method proved increasingly impractical. The paper-based sales process, in which customers entered their purchases on lists, also led to a disproportionate amount of administrative work.

Left: Marion Schreyer is really happy with the new self-service terminal, which makes paying in the farm shop more efficient and secure

Right: The Schreyer family's farm shop is open every day of the week



SELF-SERVICE TERMINAL FOR CARD PAYMENT

To optimise internal processes, the shop owners decided to invest in a self-service terminal that accepts cashless payment systems. The hardware and software is supplied by Anker, one of Germany's providers of integrated checkout systems. "Switching to the self-service terminal was the next natural step for us. We want to offer our customers a modern and fast shopping experience and at the same time make our internal processes more efficient," explains Marion Schreyer, farm shop manager, adding: "The system is simple, intuitive and secure. It enables us to manage our products more effectively and offer our customers a cashless payment option."

The self-service terminal means we don't have to worry about cash handling, which not only saves us money but also makes things more secure. Additional security is provided by a camera surveillance system installed in the farm shop. Since the self-service terminal has been in operation, the accounting effort has been noticeably reduced, as all transactions are now automatically recorded and synchronised. ■

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Photos (2): Pan Oston

Freedom of choice at the checkout

With the exception of Ikea, furniture and home furnishing retailers are still in the SCO discovery phase. However, a number of start-up projects are currently underway. One example is Poco, with 127 stores in Germany one of the largest furniture retailers in the take-away segment. Four Poco stores are currently equipped with SCO technology.

Poco continues to grow, opening three to five new stores each year. At the same time, the retailer is revamping the checkout zones of its existing stores. Self-checkout areas will also be set up to offer customers another modern and fast alternative.

When it comes to technology, the company is looking for a standard solution that is economical, visually appealing and easily scalable as more stores are opened. With this in mind, Poco has opted for the SLIM Balance Large self-checkout from Pan Oston – a standard model within the SLIM product range. The practical handling, the look and the price-performance ratio convinced Poco. The range also includes belted checkouts. These can be integrated into Poco's new checkout set-up to serve cus-

tomers who want to pay at a conventional staffed checkout.

CASH PAYMENT ALSO POSSIBLE Pan Oston looked at customer flows, how people pay and the range of items in advance to find a self-service solution that would work. Poco went for a self-checkout solution with three self-service terminals for the furniture store in Münster. One of the SCO checkouts is for cashless payments only. The other two self-service stations are also equipped with cash management systems, so customers can pay for their purchases with cash. To make sure everything looks good together, the checkouts were painted in a special colour that matches the other colours used

Left: The self-checkout zone at Poco in Münster is roomy, clearly laid out and in line with the retailer's brand identity

Right: There are three self-service stations in the Poco store in Münster. One is just for card payments, and the other two also take cash



in Poco stores. For security reasons, the SCO area is equipped with two electronic exit gates that open as soon as the customer has scanned the barcode on their receipt.

OPEN AND SECURE As well as the self-checkout area, there's a conventional belted checkout at the Poco store in Münster. This is for customers who don't want to pay using the SCOs. The layout is designed so that the checkout staff can see the SCO area easily and can help out quickly if there are any problems. On top of that, this solution gives an extra layer of security, as customers always know they will be seen when they move through the SCO area.

Poco says that its experience with introducing self-checkout systems in four stores has been really positive. The systems work perfectly and customers love them. The high level of acceptance is also evidenced by the amount of sales made through self-checkouts in different stores, which make up between 30 and 40 percent of total sales. ■

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Self-service checkouts from the Netherlands

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fully customisable solutions are independent of hardware and software and give customers maximum freedom. Our market position was further strengthened by the merger with 4POS in 2023. We provide our customers with practical solutions that fit their needs. European production guarantees high-quality industrial standards. Pan Oston is the perfect partner to help you set up the best checkout zone.



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Photo: Katrin_Hengst/Diebold_Nixdorf

More time for customer service

Thalia is the leading omnichannel bookseller in Germany, Austria and Switzerland. By adding self-checkout terminals to the mix, the book retail specialist is looking to make shopping a better experience for customers while also streamlining internal processes.

In summer 2022, Thalia and its tech partner GK kicked off the self-checkout project with a launch event. GK's checkout solution, GK Retail 12, has

“Thanks to the self-checkout, the trained booksellers who work at Thalia can now focus more on helping customers.”



Stephanie Spurzem
Head of Sales Support
at Thalia

Photo: Thalia/private

been in use in Thalia's checkout zones for many years. The technology behind the SCOs at Thalia – and all Thalia checkouts going forward – is GK's Omni POS checkout solution. “The idea is to free up the checkout area at busy times and avoid long queues at the cash desks. Thanks to the self-checkout, the trained booksellers who work at Thalia can now focus more on helping customers,” says Stephanie Spurzem, who's the Head of Sales Support at Thalia.

GRADUAL CHANGEOVER The first SCOs were launched in a few selected pilot bookshops in February. In the next phase of the project, all the checkouts in Thalia bookstores will be converted to GK Omni POS by the end of 2024. Before the

Left: Thalia, a bookseller with a 100-year tradition and around 500 stores in German-speaking countries, has already set up self-service stations in about half of its stores

customer starts the process, no data on products, customer cards, vouchers or coupons is stored in the checkout software. Only when an item is scanned at the self-service terminal is the data retrieved from the SAP backend and delivered to the SCOs' software in real time. To make sure there's a smooth data supply in the bookstores and at the company's HQ, Thalia made sure that GK's POS software works well in both tech worlds until all its locations are converted to the GK platform at the end of September 2024.

This system lets Thalia adapt to whatever the future brings, thanks to its IT architecture. It also makes it easy to integrate external apps into the solution. "We used this project to make the collaboration between Thalia and GK even better. We really benefit from this. We're much faster and don't

have to worry about doing a lot of extra work when we're putting out new releases or product updates. It's a real bonus that we can now integrate our own apps into the cash register. So now we're a big cross-location and cross-company project team working together on solutions," says Francesco Di Maggio, Manager SAP POS at Thalia, summing up the agile team and project structure.

PLUG-IN RETROFITTING "App enablement" lets Thalia's developers plan, implement and retrofit new features, like product-related age approval, on their own. "There will always be issues related to self-checkouts that we will continue to develop in an agile way. With the GK solution, we are now in a much better position to do this. We are no longer as reliant on GK resources as we used to be. This makes planning much easier and is exactly the effect we wanted," explains Thalia manager Francesco Di Maggio. ■

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GK Software is changing the way we experience shopping. In-store, online and beyond. GK has been solving retail challenges with cutting-edge technology for over 30 years. With CLOUD4RETAIL, GK offers an open and unified cloud platform for different store concepts: from autonomous stores and intelligent loyalty solutions to smart self-checkout solutions – GK enables unique shopping experiences that can be adapted to any store architecture.

As a global player for retail cloud services, GK has 16 locations in 10 countries, including Berlin, Paris, Singapore and Johannesburg. More than 1,200 employees work on



solutions for an all-encompassing shopping experience, improving the relationship between customers and retailers every day.



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Fotos (3): Avery Dennison

With a bag through the exit gate

For visitors at trade fairs, long waits to get snacks and refreshments are a familiar experience, especially during peak times. Catering service provider Aramark wants to change this. All the merchandise in its newly refurbished shop at the Messe Stuttgart convention centre has RFID tags, and the automated checkout process takes only a few seconds.

“This innovative RFID technology fits perfectly with our idea of progress.”

Arnd Rune Thomas
Managing Director
of Aramark



The full-service caterer Aramark is a leading company in its market segment. With roughly 6,500 employees, it is known throughout Germany for sustainable technical solutions. Based in Neu-Isenburg, the caterer provides services for stadiums, arenas, event locations and zoos in some 20 cities through its Sport & Event Catering department. It also operates restaurants at major German trade fair locations.

Visitors at a trade fair often want to pick up a bottle of water, sandwich or candy bar without losing a lot of time. However, they sometimes have to wait in line in the shops, especially in busy periods. At Messe Stuttgart it's now different. In the newly furnished shop operated by Aramark, purchased items are automatically detected by means of RFID

tags when customers leave. Payment thus takes only a few seconds. The goals of the project, to minimise queues and have satisfied customers, were achieved.

SCANNING THROUGH THE SHOPPING BAG “This innovative RFID technology fits perfectly with our ideas of digitalisation and progress,” says Arnd Rune Thomas, Managing Director of Aramark. For contactless payment, customers put their items through a scanner of the Düsseldorf start-up Payfree. They can then pay and finish the checkout process in only a few seconds. “Thanks to simple handling and quick processing, we have considerably improved the shopping experience for trade fair visitors,” says Thomas. Aramark’s innovation not only makes

Left: Bag it and scan the bag when you go: shopping in the Stuttgart trade fair shop is quick and simple

shopping easier, it is a further step towards digitalisation of trade fair catering.

All of the items in the shop are marked with a simple RFID tag. The tags are affixed to goods when they arrive for placement on the shelves. Since the shop employees already have the items in their hands, they can quickly label them with RFID tags. No additional work is involved. Customers put their articles into sustainable shopping bags and take them through the reading field at the checkout. Special tags developed for the food industry by Avery Dennison are used for this. They can be read without difficulty even on “RFID-unfriendly” articles containing metals or liquids.

DIGITAL RECEIPT After items have been paid for, they are automatically deleted from the inventory. In this way the team can see at all times what has been sold and what remains in stock. The receipts are available in digital form, eliminating the need for paper. “It’s important for us to establish processes that can be applied in other areas,” says Arnd Rude Thomas. “We can easily incorporate this solution in our infrastructure and use it in other locations.”

For example, simple checkout with RFID is already known in fashion retailing. The use of RFID tags with difficult food products has worked well, opening up a further segment. RFID tagging of articles right at the source is possible in a wide range of other applications in the value chain, from the manufacturer’s outgoing goods department to intermediate logistics and to shops. This offers a clear advantage over technologies that are limited to the point of sale. ■

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Avery Dennison implements smart, creative and sustainable inventory and customer management solutions for retailers. By using digital triggers to digitalise products and making this information continuously available via a cloud system, retailers can keep track of their stocks along the entire value chain in real time. With this solution consumers can also get additional product information, for example on recycling. New services like self-checkouts are now easy to introduce – for a transparent world. The result: higher sales and satisfied customers.

Avery Dennison has 35,000 employees in more than 50 countries.



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Age verification at the terminal

24/7 smart stores make it possible to sell food products outside of store hours. Edeka Southwest operates a small automated store in the centre of Offenburg with a kiosk terminal and robot technology for retrieval of goods. A special feature is age verification by means of document scanning.



Photos (2): Pyramid



Autonomous stores that can operate unstaffed around the clock are one of the big new trends in food retail. A variety of 24/7 store concepts exist, including grab & go, self-checkout and smartphone scanning. Shoppers can pay at a terminal or at vending machines without direct access to the products. Kiosk terminals are key technologies for acceptance of 24/7 stores by consumers. Since they have no staff who could assist customers at the self-checkout machine or collect payments when the self-service infrastructure fails, it is necessary for the terminals to be highly reliable and easy to use. Only in this way can shoppers be convinced that the concept is viable. These stores occupy very little space, which means that the dimensions of the terminals are a key factor for operators, along

with usability. The less space the terminals take up, the easier it is to integrate them in the store concept.

The Edeka Group, a leading food retailer in Germany, has found an ideal solution with its E 24/7 system. The first E 24/7 pilot store from Edeka Southwest is located in the Station of the Future in Renningen. For two years, there has also been a store in the city centre of Offenburg. Here one can buy more than 500 everyday essentials at any time of the day or night. In addition to a dry food assortment, there are refrigerated products, convenience foods, snacks and beverages. Customers order

Left: Items are ordered and paid for at the terminal
Left (circle): Document scanner for age verification
Right: Two output compartments are available



Photo: Edeka

products from a terminal (Polytouch Passport 32). Age verification is also possible for purchases of alcoholic beverages. For this, an official document such as an ID card, passport or driving licence must be presented at the terminal before the goods are picked up. Purchasers are automatically asked to scan in their proof of age using the document scanner.

AUTOMATIC RETRIEVAL Selecting goods is easy. The desired products can be chosen from various categories at the self-order kiosk and added to the shopping cart. Payment is then possible via credit card, Girocard, Apple Pay or Google Pay. After payment the products are retrieved from storage by an

automatic conveyor system and deposited in an output compartment. The process takes only a few moments. Items ordered locally at the terminal are retrieved as soon as payment is complete. After payment the system asks whether the customer would like a printed receipt. In this case a paper receipt is issued. Access to the E 24/7 store is open to anyone. There is no need to register. ■

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Photo: Rossmann

It's all about finding the right mix

Payment terminal providers are also benefiting from the increasing use of self-checkout terminals in the retail sector. While almost exclusively cashless payment methods are accepted in the non-food sectors, food retailers and the do-it-yourself sector in particular usually also offer their customers cash payments.

In line with changing habits towards more cashless payment methods, the range of methods available at self-checkout terminals has also changed. While 97% of SCO checkouts in food retail were still equipped with cash modules in 2015, the results of the EHI census for 2023 show that this figure has fallen to just 39%. The situation is similar in DIY stores. In drugstores, furniture stores, bookstores and other non-food sectors, on the other hand, almost all self-service terminals accept card payments.

Regardless of the trend towards cashless payment, many retailers shy away from the higher investment costs if the SCO terminal is to be

equipped with a cash module. Maintenance is also much more intensive than with pure card payment systems. For Oliver Unger, Head of Treasury at grocery chain Tegut, the situation is clear: "An investment in cash recyclers is not worthwhile due to the expected low utilisation." However, there are also good arguments in favour of accepting cash: Almost 60 percent of transactions in the German retail sector are still made in cash (source: EHI). It is therefore important to give customers a choice – especially when retailers reduce the range of conventional, staffed checkouts, as is the case with Ikea, for example. If bills and coins are not used here, there is a risk of losing some customers.

Left: Self-checkout terminals in Rossmann drugstores only accept card payments

UNATTENDED APPROVAL IMPORTANT Rainer Birkner, Sales Lead Retail at CCV, agrees. “We recommend mixed applications of SCO units with and without cash modules to our retail customers.” CCV is one of the leading providers of payment terminals and its products are installed in the self-checkout terminals of well-known retailers such as Aldi Süd, Lidl and Rossmann.

Card terminals at the self-checkout are identical to those at the staffed checkouts. In almost all cases, the same payment methods are accepted there as at the POS checkouts. It is important that the SCO terminal has so-called unattended approval, such as the frequently installed CCV Pad Next model. Even if self-checkout terminals are monitored by employees who assist customers as required, the operation of the terminal must be self-explanatory.

Communication between the card terminal and the POS system is crucial for the smooth processing of payment transactions in the retail sector. ZVT and OPI terminal interfaces enable the transfer of

“The trend towards Android will also be visible in the self-checkout sector in the future.”

Rainer Birkner

Sales Lead Retail, CCV GmbH

transaction data such as payment amount, payment method and status information. The card terminal and POS system must support a variety of payment methods, including credit and debit cards, contactless payments, mobile payments such as Apple Pay or Google Pay and, if applicable, alternative payment methods such as digital wallets. The interface issue and ensuring the smooth integration of software protocols requires close coordination between terminal manufacturers and checkout unit providers.

TREND TOWARDS ANDROID CCV is seeing a growing trend towards Android-based operating systems. The broad acceptance and familiarity with this platform as well as its flexibility and customisability are cited as reasons. Birkner: “Android enables a variety of applications and a wide range of devices suitable for retail. This trend is also reflected in the self-checkout area.” ■

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Photo: Epson

It all comes down to the components

The smooth and permanently stable functioning of a self-checkout solution always depends on the reliability and durability of its individual components. This also applies to the receipt printer.

An important prerequisite for the efficiency of self-checkout systems is that the individual components are compatible in terms of performance and reliability. Equally important as part of a manufacturer's overall offering is the close and individual support of partners before, during and after the development of a solution. The requirements for a good printer solution are described in detail below.

“In terms of the longevity and quality of our solutions, the Epson TM-T88 series is a standard product for us. We use it either as a surface-mounted or built-in version thanks to the robustness of its printing mechanism.”

Lutz Nungesser
CSO of 4POS

ROBUSTNESS The receipt printer at a self-checkout stand is one of the most heavily stressed components. A key sign of quality is a high level of mechanical reliability, which is also primarily responsible for a device's longevity.

SPEED A print speed of at least 300 mm/second is the standard for a thermal printer, with fast devices reaching 500 mm/second. The thermal print head has hundreds of computer-controlled heating elements that transfer tiny heat dots to a thermosensitive paper in fractions of a millisecond. This technology both enables this high speed while also making ink superfluous, thus saving on routine printing costs.

COMPATIBILITY In order for self-service systems to achieve the longest possible service life, a high

Left: All components of self-checkout systems must be compatible in terms of performance and reliability

level of mechanical and digital backward compatibility is crucial, in addition to the mechanical durability of their components. Mechanically compatible means that the housing has identical dimensions to its predecessor versions, so that no changes to existing brackets or installation solutions are required when replacing the system. Digital compatibility is just as important: if the printers are compatible with each other, configurations can be made via a web interface with just one click.

ENERGY EFFICIENCY The operating mode of the current generation of receipt printers consumes around 50 watts, and less than 30 watts in more favourable cases. The automatic switch to standby mode is important. Here, the devices achieve a power consumption of less than one watt – particularly relevant because the printers are on standby for between 80 and 90 percent of their service lives.

PAPER CONSUMPTION The text structures can be optimised via setting variants, e.g. the areas to be

“We recently equipped selected branches with self-service checkouts for a major retail customer and rely on receipt printers from Epson because in addition to their other advantages, we particularly appreciate their reliability.”

Florian Burgstaller
Managing Director, Shopreme GmbH

printed can be enlarged. This means that the text image can be compressed and the paper cut off earlier, which in turn can lead to paper savings of 20 to 50 percent.

SERVICE Simple operation, simple service and simple repair are at the top of the priority list. This includes, for example, the ability of a receipt printing system to display error messages and thus provide initial information on troubleshooting. Skilled checkout staff should be able to carry out minor repairs or replace the cutter themselves, for example. ■

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Photo: Axis Communications GmbH

Combined Prevention

The picture is mixed, with no truly valid figures available. However, the high willingness of retail chains to invest in technology solutions indicates that self-service checkouts are susceptible to shoplifting. The focus of the prevention measures: video technology.

Are self-checkouts responsible for the increase in inventory discrepancies in retail, and if so, to what extent? There is no shortage of opinions, assessments and non-representative surveys. “More theft occurs in stores with self-service checkouts, and losses can amount to one to two percent of turnover,” says Prof. Stephan Rüschen, an expert in food retail at the Baden-Wuerttemberg Cooperative State University.

PROBLEM WITH PRIORITY There is no really valid data available to date. The EHI has analysed the development of shoplifting and recorded a significant overall increase of around five percent for 2023 compared to 2022. However, the extent to which this is attributable to self-service checkouts must also be left open by the EHI study. “Difficult to determine,” says EHI expert Frank Horst. This statement is plausible because if goods have left the store

unpaid and unnoticed, the retailer cannot be sure how they did so. He can only obtain reference values, for example through before-and-after comparisons or comparisons between stores with and without self-checkout zones.

Self-service checkouts are now also spreading dynamically in Germany. The systems are largely running smoothly. Customers are gaining experience and using them routinely. As a result, the presence of employees in the self-service zone who help and assist customers, especially during the introductory phase of the self-service systems, could be reduced – which is actually very welcome given the staff shortage in retail. However, this also removes factual and psychological barriers for potential shoplifters.

AI-SUPPORTED VIDEO ANALYSIS By combining various individual measures – from staff presence

Left: Theft prevention begins in the entrance zone: Large video screens deter potential shoplifters

to EAS systems and video surveillance – retailers have so far tried to keep their inventory discrepancies within limits. Combined prevention will continue to be the method of choice in the future, but with a new focus on video technology. Until now, video sequences had to be viewed and evaluated manually by employees in the back office. This is time-consuming, costly, error-prone and not fast enough. In the future, technology will take over this job – in the form of software that analyses images and uses deep learning to correctly evaluate every process on the sales floor. Retailers have high hopes for this technology. Migros Switzerland, for example, sees the combination of video cameras and data-driven analyses as nothing less than “a new dimension in theft prevention.”

Pilot tests at self-service checkouts are already underway. Some retail outlets, including the

drugstore chain Rossmann, are about to go live. The applications initially focus on non-scans: in other words, items that are not scanned or not scanned correctly, either intentionally or due to operating problems. This addresses a significant part of the risk of loss. Experts assume that non-scans account for around 60 percent of fraud cases at self-service checkouts.

NEW APPLICATION SCENARIOS On the other hand, thieves who hide fine perfume in their clothing at the shelf and scan a cheap deodorant at the self-service checkout are not (yet) being recorded. However, AI-supported video analysis is developing dynamically. In future, it will be possible to detect perfume thieves at the shelf based on their typical stealing behaviour and keep them in focus until checkout. The technology will target groups of people behaving suspiciously. It will recognise how members of organised gangs work together in the store. It will track unstopped thieves at the checkout to the company parking lot and register their license plates – to name just a few examples. (Mz) ■

“Taking a future-oriented approach”

AI cameras have their own analysis functions. Do retailers need such cameras? Thorsten Grimm, Key Account Manager and retail expert at Axis Communications, explains.



Thorsten Grimm
Key Account Manager and
retail expert
Axis Communications

Does it make sense for retailers to work with special AI cameras?

When purchasing video security solutions, retailers should keep the long-term outlook in mind. A security camera has a service life of ten years or more. Over this period, it should also be suitable for new uses and application scenarios. Future innovations will allow AI-enabled security cameras to perform completely new functions in virtually every industry.

What can these cameras do?

The heart and brain of every camera is its system-on-chip (SoC). Most of our cameras have an in-house developed ARTPEC SoC, which enables “on the edge” analysis functions based on deep learning. This enables them to do this directly

on the camera – for example, to capture objects more precisely and classify scene details.

This is actually done by the central analysis software. So why AI on the camera?

If the AI-based analysis takes place directly on the camera, both valuable bandwidth in the customer network and computing power on the local server can be saved. The high precision of the analysis functions also means that there are fewer false alarms. Another key advantage of the AI-enabled camera is that evaluations relevant to data protection legislation do not have to be carried out on servers or in the cloud, but can be carried out in the closed system of the network cameras.



Photo: buritora/stock.adobe.com

AI as a beacon of hope

Deriving meaningful information from digital images and videos: The hopes of retailers that they will soon have a new and highly effective tool against theft at self-checkouts are based on computer vision, an AI sector.

With a return on sales in food retail of just one to two percent and an average inventory loss of a good 0.6 percent of sales, every tenth of a percentage point by which the loss increases is extremely painful. “Theft has now become a constant issue for our company management,” explains the head of organisation at a large retail chain.

The problem here is not so much the occasional offenders who want to get small “discounts” at the checkout. Rather, it’s the budding and seasoned professionals who are after high-priced products and prefer self-service stations because they are familiar with the workings of all technical protective measures and find creative ways to circumvent them. They also like to consult certain forums on social media, where tips are diligently exchanged on

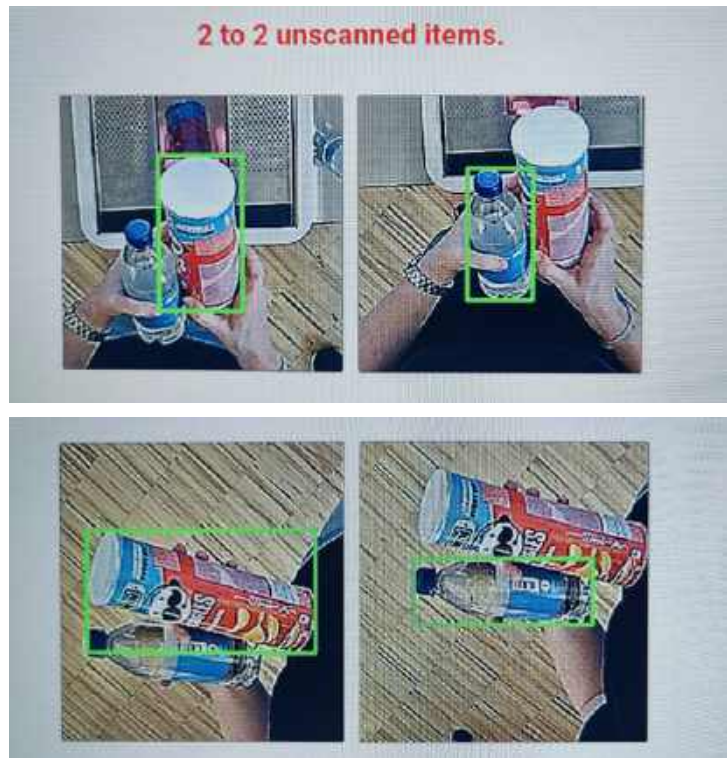
which retailers can be stolen from with which methods and with little risk.

Retailers must therefore invest in more security at the SCO. Many companies have mandatory video surveillance systems installed when setting up self-service zones. Others are upgrading. And almost all major retail chains are working on using these systems and AI-supported applications to set up automated detection of attempted theft.

STRUCTURED REACTION For this purpose, the camera is aimed at the scan area of the self-checkout terminal. The video sequences produced are compared in the background with predefined fraud scenarios. Was an item passed by the scanner without being scanned? Was another item scanned?

Left: Increasing theft is dampening retailers' enthusiasm for the high usage rates at self-checkouts. Although technical tools help, they are often tricked by the professionals. The retailers' hopes rest on AI applications

Right: With the help of computer vision technology, cameras can support retailers in making self-checkout more secure



Photos (2): Checklens

Was the EAN code covered by a finger? Were two articles held in front of each other? Do the article and EAN code not match? Whether on purpose or through negligence: the security system, consisting of IP cameras and AI-based software, is designed to learn, recognise and warn of such operating errors or misconduct in real time.

Users can define and configure their reaction to this themselves: Notification to the customer on the terminal display that an item has not been entered correctly – alternatively or in combination with an audio announcement. Information to the responsible employee, for example on a mobile device, on which the recorded transaction can be viewed again. Automatic termination of the checkout process at certain points or during certain processes. And/or direct contact and control of the customer by the store staff. “Thanks to such AI-supported real-time analyses, retailers can make data- and fact-based decisions and prevent potential inventory discrepancies at self-service checkouts,” says Nino Hörtrich, Head of Global Marketing Retail at Diebold Nixdorf.

KEY POINT – FALSE ALARM So the technology promises much. Migros Switzerland, for example, sees the combination of cameras and data-driven analyses as “a new dimension in theft prevention.” However, effort is required to penetrate this dimension. The retailer must provide cameras, software and computer capacities that are capable of processing the data volumes generated in real time. And he has to invest in manpower and software training.

Simply install the application and start live operation right away? No, it's not as easy as that. This is because the AI-supported software must first be trained in order to reach a status defined by the retailer at some point – a functional quality in which all variants of real fraud attempts at the SCO are rec-

ognised as far as possible under market-specific conditions. And where, on the other hand, the number of false alarms is reduced to a minimum. After all, no retailer wants to or can afford to annoy its customers by making unfounded suspicions, for example because the system triggers a non-scan alarm when a bag of bread rolls is brought in.

ROSSMANN AS AN EXAMPLE The AI learning phase at Dirk Rossmann GmbH started in mid-2023, initially in a small number of stores. IP cameras were installed above the self-service payment stations and back office, high-performance workstations, which run AI software. Every transaction at the self-service checkouts is recorded by video,

“We want to further develop our AI so that personal items can be reliably distinguished from products that actually have to be scanned.”



Tinh Le-Fiedler
CEO
Nomitri GmbH, Berlin

“Thanks to AI-supported real-time analyses, retailers can make data- and fact-based decisions and prevent potential inventory discrepancies at the checkouts.”

Nino Hörtrich

Head of Global Marketing Retail
Diebold Nixdorf

and an AI interface to the checkout software enables the individual item scans to be compared with the payment data in real time. The AI reports deviations and other anomalies.

This is where the training begins: a comparison of the AI assessment with a manual analysis shows where the AI is right or wrong in its assessment of the processes. So employees examine the respective video sequences in the background, confirm or correct the AI assessment of individual processes, helping it step-by-step to avoid errors and

become smarter. In this learning phase, a process at Rossmann only triggers activities at the SCO if it has been confirmed as suspicious by the human in advance. Objective: The error rate should not exceed three to a maximum of five percent. That takes time. Once the targeted low error rate has been achieved, customers should receive a message directly on the SCO screen about any non-scans detected.

THE MARKET OF SOLUTIONS With the establishment of self-service checkouts in retail and advances in AI applications, software houses and start-ups worldwide have also begun to develop AI-based security tools for self-checkout. There are now a number of applications on the market, some of which are also offered in cooperation with the relevant SCO service providers. For example, Diebold Nixdorf, together with UK software partner See Change, has developed a corresponding solution under the label Vynamic Smart Vision, which is already being tested in live operation. ITAB works together with the specialists Signatrix and Rapitag in the field of camera-based AI and is currently also conducting

“Net profit in the second half of the year”

Konstantin Heiller, Managing Director of Checklens Technologies Ltd. in Vienna, on the return on investment in the analysis software.



Konstantin Heiller
Managing Director of
Checklens Technologies Ltd.

Mr. Heiller, you promise a payback period of six months. What is the calculation behind this?

Together with our customers, we've determined that between 2,500 and more than 10,000 euros are lost annually per self-service checkout due to scanning errors, depending on the region and retailer. That's our benchmark. So how can the AI solution recover value? In 22 percent of cases, we saw that customers who were notified on the terminal display that an item had not been scanned switched to the checkout next to it and scanned it there. In a good third of alerted transactions, we found that the customer no longer tried to scan again. The items then remain in the store, which also represents a value.

And the remaining 40 percent of cases?

This is recovered by a re-scan directly at the checkout. A single-digit percentage of the total alarms still leaves room for improvement, be it in the processes in the store or in the AI technology itself, because I won't promise any customer a 100% hit rate.

What does this mean for the ROI?

Our aim is to make the Checkscan AI so cost-efficient and effective that the value recovered covers the annual costs by June of a year at the latest and the rest of the year represents a net profit for the retailer.

Right: Signatrix's AI software is designed to detect unusual behaviour patterns at self-checkout

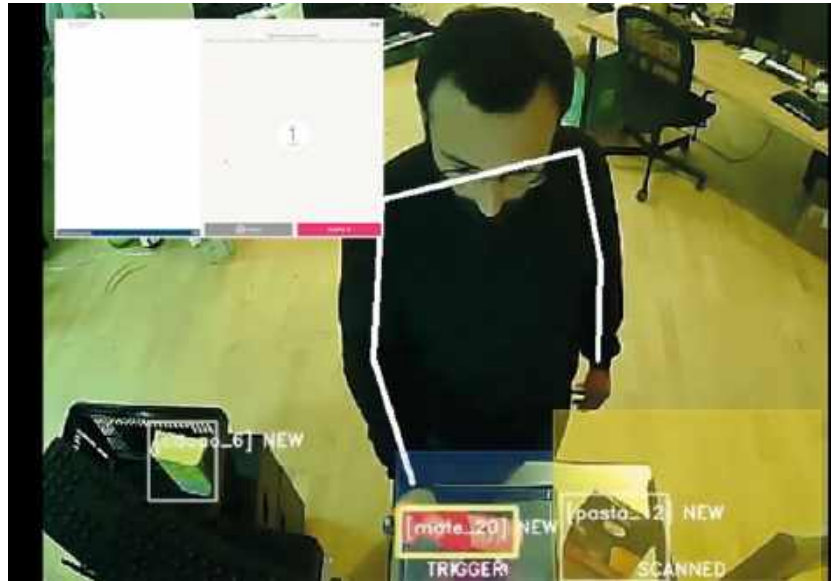


Photo: Signatrix

tests at a number of retailers. The company Checklens Ltd. and the Berlin-based tech company Nomitri GmbH, which was founded in 2019, can also point to initial practical applications.

The solutions usually have one thing in common: when identifying the goods at the self-checkout, they work with proprietary procedures that limit the effort involved in starting up the system and that – at least after an appropriate learning phase – should still achieve good results. This particularly affects retail companies with a wide range of products, such as supermarkets and hypermarkets. “For retailers with up to 150,000 items in their constantly changing product range, supplying the AI with image data of all items would not only be extremely time-consuming, but also very costly,” says Trinh Le-Fiedler, CEO and co-founder of Nomitri. Instead, with the Nomitri software called “EmSCO”, this happens automatically when the application is running and is continuously renewed and updated decentrally by the system.

The same applies to the identification of non-scan-relevant items such as foreign items, bags, cell phones or purses brought by the customer and deposited in the shopping cart or on the shelf. Here too, an application brings basic knowledge with it, but it has to learn more. “We’re using the live deployments in the stores to continuously improve our AI and develop it further over the next one to two months so that personal items can be reliably distinguished from products that actually need to be scanned,” explains Trinh Le-Fiedler.

FASTER RETURN ON INVESTMENT The AI-supported analysis methods therefore need to keep learning, but they promise to be a highly effective tool against all types of theft at the SCO. However, anyone who spends money on it will still want to know how quickly that investment will pay off. Clearly quantifiable main items in a corresponding

invoice from the retailer are the costs for the purchase and installation of cameras, for the screens in the back office, for the rental of AI-supported software and for additional computer capacity – whereby the question must be clarified as to whether data protection-sensitive processes should be kept in the closed in-house system and anonymous processes should run via the cloud.

For the required manpower, on the other hand, the dealer will have to use estimated values. How long does the software need for its learning phase, when will it be able to switch from trial and background operation to live operation? To what extent will the company’s own employees (see the Rossmann example) have to observe and evaluate the software’s findings and help it to learn further? The amount of this cost item essentially depends on this.

On the other hand, there is the benefit of going live. Konstantin Heiller, Managing Director of Checklens Technologies Ltd., did the math with his retail customers and found that, depending on the region and store, between 2,500 and 10,000 euros are lost per self-service checkout per year due to (intentional or unintentional) scanning errors. The investment should avoid as much of this damage as possible. “Our aim is for the recovered value to cover the annual costs by June of each year at the latest,” says Konstantin Heiller. (Mz) ■



Photo: istock/elenabs

AI functions find favour

The usage behaviour at self-checkouts varies greatly between age groups. While seven out of ten 24-year-olds regularly use SCO checkouts, over 20 percent of over 54-year-olds ignore self-service technologies at the checkout. The respondents rated the AI function for automatic product recognition very positively.

These and other interesting findings are the result of a recent study carried out by EHI on behalf of KPMG as part of the Consumer Barometer 03/24. 1,000 customers were surveyed on their usage of autonomous payment processes and their perception of self-checkouts as well as the integration of AI and camera systems in the payment system. The data analysis was also carried out by the EHI. Among other results, it was noted that the use of

these technologies is not yet widespread and that there are considerable differences in use depending on demographic characteristics.

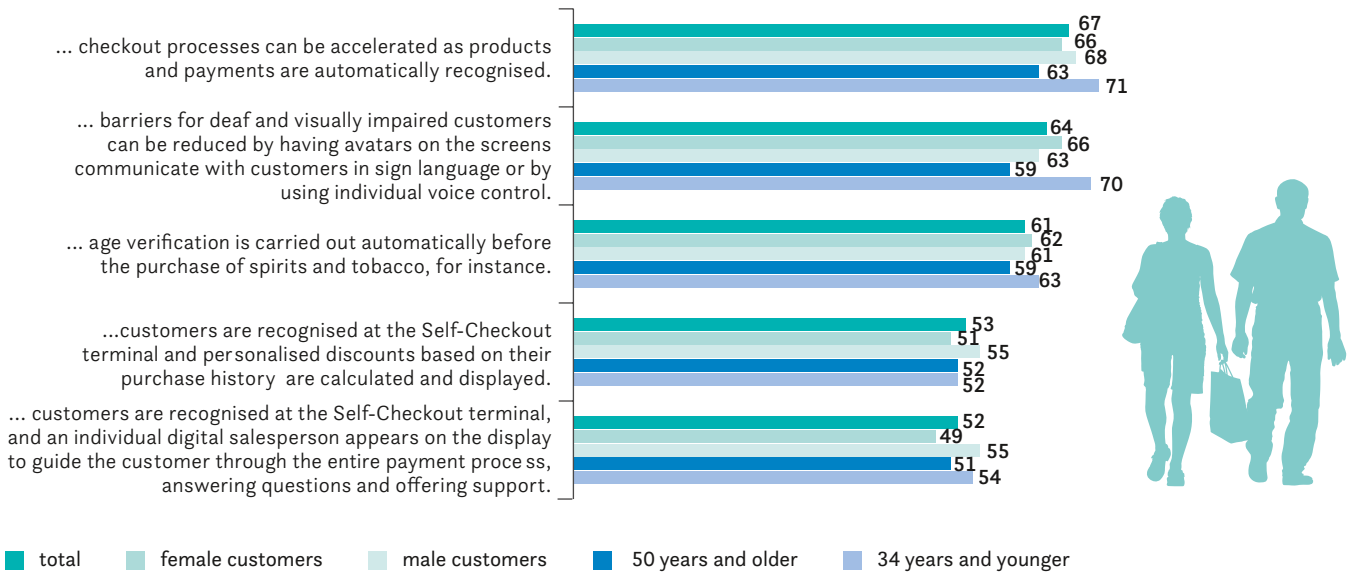
FEEDBACK OVERWHELMINGLY POSITIVE Automatic product recognition, which speeds up the checkout process, is particularly popular with customers: 67 percent of respondents value this function. Younger customers (71 percent) and male customers (68 percent) show the greatest acceptance, but female (66 percent) and older customers (63 percent) also rate this increase in efficiency positively, albeit somewhat more cautiously. Another potential of AI lies in overcoming barriers for customers with visual or hearing impairments.



Further information on the KPMG study:
[Consumer Barometers 03/24](#)

With the help of AI in the checkout area...

Figures in percent



n = 1,000; figures in percent, deviations from 100 percent are due to rounding
 Source: KPMG Consumer Barometer 03/24 in cooperation with EHI Retail Institute

Overall, 64 percent of respondents are in favour of this function. Young customers up to the age of 34 (66%) as well as male (65%) and female customers (63%) are particularly supportive of this aspect. Older customers aged 50 and over are somewhat more cautious at 59 percent, which suggests that inclusive technologies are more popular with younger generations.

Automatic age verification is also rated positively by 61 percent of customers. This function is particularly popular with younger (63 percent) and female customers (62 percent), while older customers (59 percent) are somewhat more sceptical. Another possibility offered by AI is the option of displaying a digital sales assistant at the self-checkout, which is supported by 52 percent of respondents. Younger (54 percent) and male customers (55 percent) are particularly interested in this function, while female (49 percent) and older customers (51 percent) see less of a need for it. Personalised discounts based on purchase history are popular with 53 percent of respondents. Male customers (55 percent) show more interest in these personalised offers, while female customers (51 percent) react somewhat more cautiously.

SCEPTICISM FOR CAMERA SYSTEMS The utilisation of artificial intelligence in the context of the payment process usually goes hand in hand with the integration of camera systems. Somewhat surprisingly, 63% of customers consider the use of cameras in the checkout area to be generally useful for retailers. At the same time, however, 57 percent express concerns about their privacy. Nevertheless, 49 percent of respondents recognise that cameras can increase efficiency in the shopping process, with younger and male customers being more in favour of these effects. However, 41 percent of customers would avoid stores that increasingly rely on camera technology, which shows the uncertainty of many customers towards surveillance technology. These results are particularly relevant as “human-less stores” are increasingly appearing on the German market – fully automated stores that largely dispense with human employees.

One of the key findings of the KPMG study is that self-checkout usage behaviour varies greatly between age groups. Younger generations who have grown up with digital technologies are more open to autonomous payment systems. (Rö) ■

Photo: Pentland Firth



Photo: ITAB



Photo: EHI



Photo: Wanzl



Photo: EHI

The mix has to be right

Stationary self-checkout terminals, mobile self-scanning with a smartphone, hand-held device or intelligent shopping cart and “scanless” shopping in fully automated smart stores – how will the supply situation develop and will self-checkout technologies continue to coexist in the future?

The high level of customer acceptance of self-checkout and, in some cases, self-scanning systems will lead to more retailers offering this service to their customers in the near future. We have now learned how to use them and have overcome our fear of contact. Stationary self-checkouts have the greatest growth potential. According to the results of the latest EHI market survey in 2023, around 2,600 traditional food retail stores use this technology, which is only 7.5 percent of all grocery stores in Germany. “Market penetration will grow the more retailers use this technology,” says Tom Riedemann, authorised signatory at Meyer’s Frische-Center in Hamburg. Around 100 self-checkout systems are in use in the company’s ten Edeka supermarkets, accounting for up to 50 percent of the stores’ total

sales. Not much more is possible at the moment, says company boss Jörg Meyer. The percentage could be increased, but only if the majority of retailers decided to also offer SCO technology – including food discounters.

HYBRID SYSTEMS WITH POTENTIAL Hybrid systems could become increasingly important in the future, particularly in view of the shortage of staff in the retail sector. These systems offer customers the opportunity to shop outside of opening hours, and even on Sundays depending on legal regulations. Examples of hybrid concepts include Edeka Alpen in Schönberg, Edeka Jäger at Stuttgart Airport and the Bunting Group’s Combi stores. One variant is hybrid kiosk systems, which can be



Photo: Silke Walz/drm



Photo: Shopreme



Photo: ITAB

transformed from a self-checkout system into an attended checkout by simply turning them around. Steve Howells, General Manager for Germany, Austria and Switzerland at Toshiba Global Commerce Solutions: “If these hybrid checkouts are arranged on a counter, that could work well, but not if there are several checkouts next to each other.”

Growing momentum is also expected in mobile self-scanning using hand-held scanners. They are particularly advantageous for larger purchases, as the items do not have to be picked up again at the self-service checkout and scanned again individually. The latest generation of industrial handhelds offer a wide range of connectivity functions and will make this form of self-scanning even more attractive. For example, the payment process can then be carried out directly via the handheld device without having to transfer the shopping cart to a checkout terminal.

There are now around 400 supermarkets in the food retail sector that use intelligent shopping carts with a display and integrated scanner. The sheer number of more than 10,000 “smart carts” in daily use shows that this self-scanning technology has long since been accepted by customers. Technical developments can also be observed in this segment – for example, cameras integrated into the shopping cart handle with AI support are intended to reduce the risk of fraud. Wanzl, the global market leader in shopping carts, aims to shake up the market for intelligent shopping carts with its own development at the end of 2024, with an AI version to follow a year later.

App solutions via smartphone can be implemented quickly across the board, not least because of the low investment costs for retailers. However,

“Retailers need different options for self-checkout technologies.”

**Steve Howells**

General Manager for Germany, Austria and Switzerland-
Toshiba Global Commerce Solutions

“The key to success is tailoring the SCO solution precisely to the respective circumstances.”

**Hanno Kallmeyer**

Presales Northern and Eastern Europe
NCR Voyix

“We need all the variants of automated store concepts. A “one size fits all” strategy just doesn’t work.”

**Christoph von Lingen**

Director, Global Solutions Sales
Gk Software SE

the use of smartphones for self-scanning is still relatively minimal. In food retail, the industrial scanner is clearly ahead and it is unlikely that the smartphone will overtake the handheld in the short to medium term. Ikea Germany is fully committed to “bring-your-own-device”: the self-scanning



application is integrated into the Ikea app, which accompanies the customer through the entire customer journey from the ordering process at home to the payment process at the checkout.

MARKET NICHE CONCEPTS The Rewe Group continues to invest in supermarkets with Grab & Go technology. In July 2024, a 1,200 sqm store with complex camera and sensor technology opened in Hamburg. The company claims that it is currently the largest store in Europe to be operated with this high-tech equipment. The special feature: customers can also shop “scanless” in the store without using the Scan & Go app, since their actions are recorded by computer vision technology. Payment is then made at the self-checkout. When using the Pick & Go app, shopping is completely autonomous, i.e. there is no need to go to the terminal and pay manually at the exit.

Do 24/7 high-tech stores have a future? It's no secret that the 17 test stores in Germany with Grab & Go technology are far from being profitable – and

it's not just the high hardware and software costs that have an impact. The highly complex system has to be constantly maintained, and all the structures on the shelves have to be perfectly maintained and tidy so that the camera and weight sensors can record the actions. The high-tech markets therefore continue to fall under the “research” category for the time being. The aim is to gain insights into the practicality of the technologies and customer acceptance.

In contrast, the 24/7 mini-supermarkets with self-scanning technology are already being rolled out. Low-cost concepts such as Tante Enso and Tante M fulfil an important function in local supply, especially in rural regions. The upward trend in self-scanning concepts in traditional retail will continue towards offering multiple checkout options. The self-service technologies used have long since proven their suitability for everyday use. Ultimately, it comes down to the mix, geared to the location and a demographically diverse clientele. (Lz) ■

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