PYMNTS.com

Global Cash Index™

a CARDTRONICS collaboration

SEPTEMBER 2018

MIDDLE EAST & SOUTH AFRICA EDITION

$1.4 TRILLION

Projected value of cash transactions in the Middle East and South Africa by 2021

12%

Projected CAGR of the regions' GDP from 2016 to 2021

29.8% Projected weighted average cash share of GDP for the Middle East and South Africa regions by 2021

56.8 Number of ATMs per 100,000 people in the Middle East and South Africa

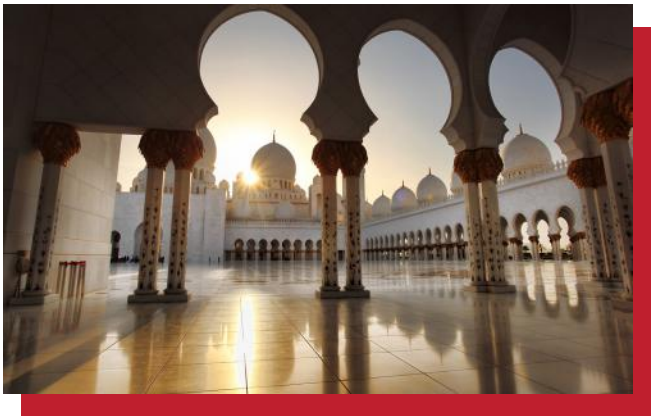
9.1% Projected CAGR of cash usage in the Middle East and South Africa regions from 2016 to 2021

INTRODUCTION

In the Middle East and Africa, while the growth of digital payments can't be denied, cash continues to play an imperative role.

In the latest edition of the Global Cash Index™, a Cardtronics collaboration, PYMNTS examines cash use in three of the largest Middle Eastern and African economies — Saudi Arabia, Turkey and South Africa — including how demographic and financial factors influence their consumers' payment preferences. One can track consumers' shifting payment preferences in these three countries by assessing a few factors, like increases in consumer spend and local countries' abilities to build out additional bank branches and ATM infrastructure.

Overall, consumers seem to be increasing their usage of digital spend management tools for other financial needs. When it comes to making day-to-day payments, however, they continue to favor cash over digital alternatives.



STATE OF CASH IN THE MIDDLE EAST AND SOUTH AFRICA

Of the three markets, South Africa has the highest cash share by far, with the total volume of cash in use representing nearly 60 percent of the country's GDP as shown in Figure 1.

Meanwhile, in Saudi Arabia and Turkey, cash share stands at 38 percent and 24 percent, respectively. As such, the Middle East made $0.9 trillion in cash payments in 2016, according to our analysis — a number expected to increase to $1.4 trillion by 2021.

Despite competition from alternative payment methods, the projected decrease in cash share by 2021 is minimal for all three countries, particularly in the case of South Africa (Figure 2). Median cash share is projected to decline only 4 percent for Saudi Arabia, dipping from 38 percent in 2016 to 34 percent in 2021.

FIGURE 1. CASH SHARE BY NATION, 2016
USE OF CASH AS A SHARE OF GDP

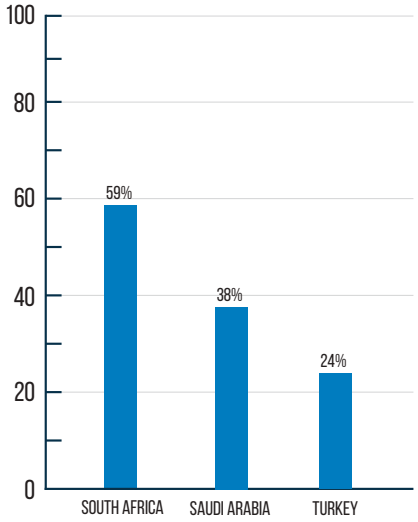
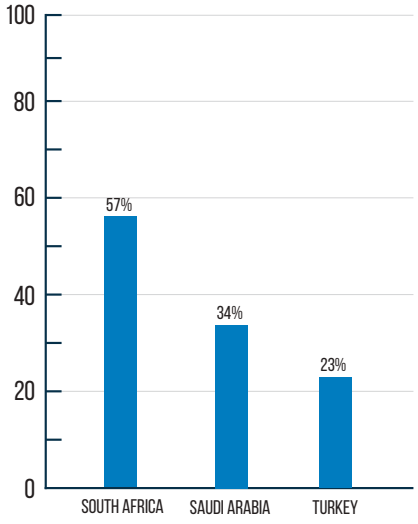


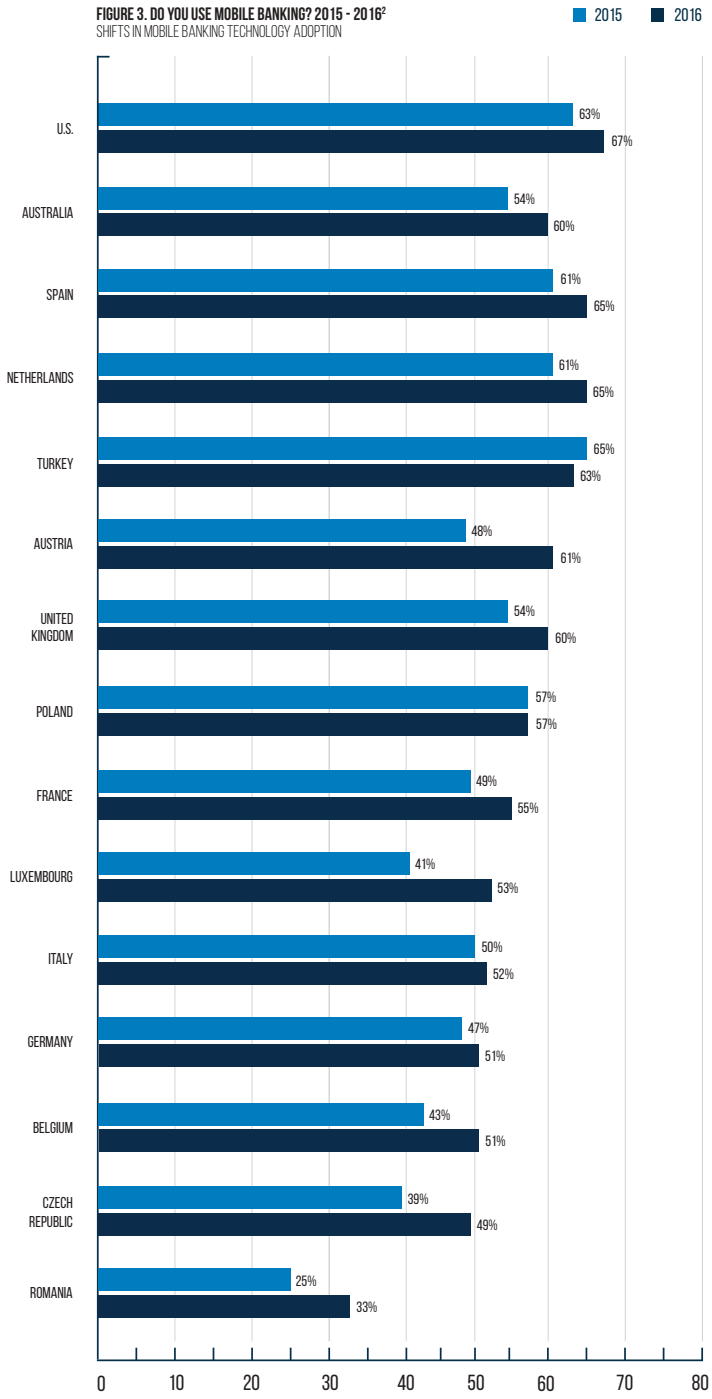
FIGURE 2. CASH SHARE PROJECTION, 2021
ANTICIPATED CASH WITHDRAWALS AS SHARE OF GDP



Consumer behavior is an essential factor when it comes to cash's staying power in Saudi Arabia, South Africa and Turkey. Just 14 percent of the Middle Eastern population has access to online financial tools, for example, as many of them are unbanked and therefore do not have modern digital banking service accounts.[1] More than 40 percent of Turkish adults lack access to a formal bank account, too.

The growing number of ATMs and bank branches in the Middle East provides additional opportunities for financial inclusion, though, and the rise of the smartphone is having an impact on all three nations' financial ecosystems. Mobile banking, not to be confused with mobile payments, is proliferating everywhere, as shown in Figure 3 — especially in Turkey.

FIGURE 3. DO YOU USE MOBILE BANKING? 2015 - 2016[2]
SHIFTS IN MOBILE BANKING TECHNOLOGY ADOPTION



[1] Author unknown. The Global Findex Database 2017. World Bank. 2017. https://www.businessinsider.com/the-worlds-unbanked-population-in-6-charts-2017-8. Accessed September 2018.
[2] Author unknown. Mobile banking and shopping set to surge. ING. 2016. https://www.ing.com/Newsroom/All-news/Mobile-banking-and-shopping-set-to-surge.htm. Accessed September 2018.

Mobile banking might be one of cash's key challenges, but the Saudi Arabian, South African and Turkish economies are all projected to grow in the next couple of years. This will likely lead to an increase in GDP, the amounts consumers spend and, despite the emergence of new technologies, cash usage for all three countries — even as cash share declines.

Cash share in each country is expected to nominally decrease by by 2021, too, while cash usage is projected to increase, as shown in Table 1. Each regions' GDPs are positioned to grow between 2016 and 2021, with Turkey experiencing the fastest growth at 14.5 percent (Table 2).

TABLE 1. CASH SHARE PER COUNTRY
AVERAGE CASH SHARE OF GDP PER NATION FROM 2006 - 2021

DESCRIPTION	2006	2011	2016	2021
Saudi Arabia	47.7%	33.3%	37.5%	33.7%
South Africa	--	72.4%	58.8%	56.5%
Turkey	16.3%	20.5%	23.5%	22.9%
Weighted Average Cash Share	--	34.8%	33.3%	29.8%

TABLE 2. HISTORICAL AND FORECAST TOTAL USE OF CASH, BY COUNTRY (BILLION DOLLARS)
HISTORICAL CASH USAGE BY NATION FROM 2001-2016 AND PROJECTED CASH USAGE BY NATION FROM 2016 - 2021

COUNTRY	2001	2006		2011		2016		2021	
	CASH USE	CASH USE	CAGR 2001 - 2006	CASH USE	CAGR 2006 - 2011	CASH USE	CAGR 2011 - 2016	CASH USE	CAGR 2016 - 2021
SAUDI ARABIA	--	179.7	--	223.5	4.5%	241.9	1.6%	270.4	2.3%
SOUTH AFRICA	--	--	--	251.9	--	294.3	3.2%	399.3	6.3%
TURKEY	--	78.0	--	173.1	17.3%	371.7	16.5%	732.0	14.5%
TOTAL	--	257.7	--	648.5	21.8%	907.9	21.3%	1,401.7	23.1%

Cash is expected to maintain its strong role in all three countries' financial systems, even as new technologies become more popular. The number of accessible ATMs and bank branches is also increasing which is helping cash to remain accessible throughout these nations.

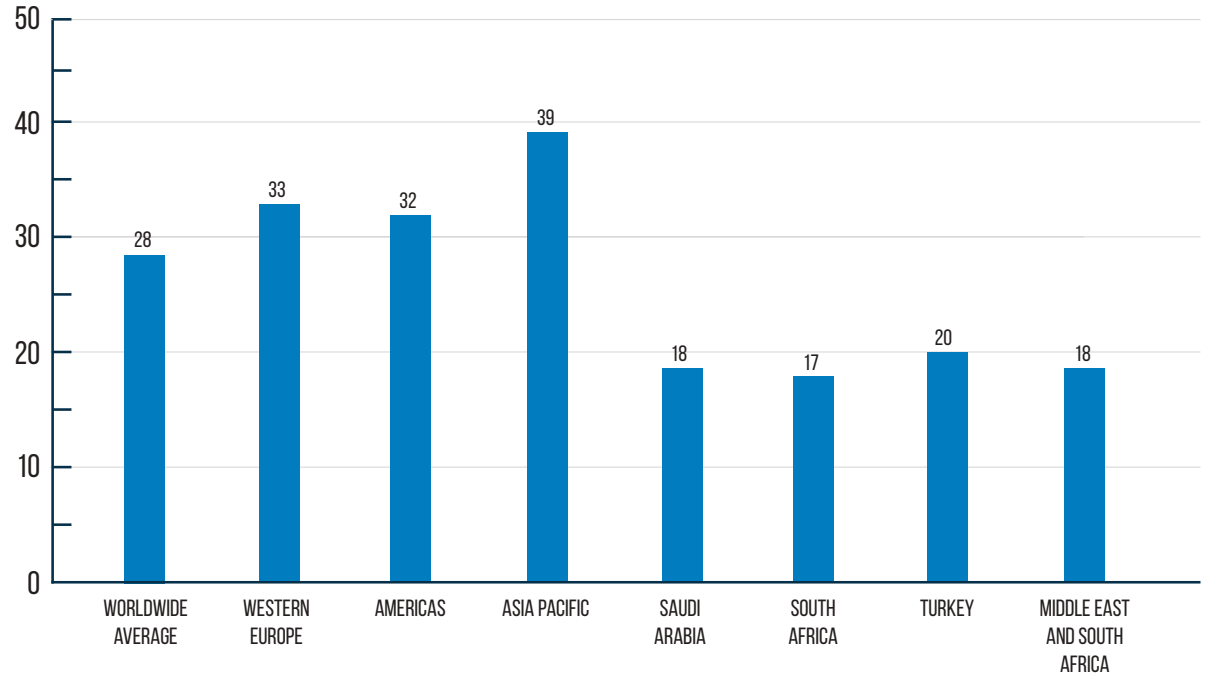
CASH ACCESSABILITY

A large percentage of the Middle Eastern and South African populations is unbanked, making new bank branches and ATM availability important. These consumers rely on cash out of necessity, and both points allow them — as well as their banked counterparts — to better access cash and other financial services.

ATM availability in Saudi Arabia, South Africa and Turkey shows the region's financial inclusion trend is continuing. More consumers are becoming connected to the global financial ecosystem in these locations, and doing so without lowering their cash usage.

To gauge cash accessibility, we compared the Middle East and Africa to other global regions in our ATM and Bank Branch Availability Indexes, a breakdown of which can be found in our Methodology section (p. 22). As shown in Figure 4, we found that the ATM Index score for these regions is less than half that of the Asia Pacific region at 39 — the highest of all surveyed markets — and 10 points lower than the worldwide average of 28.

FIGURE 4. ATM AVERAGE INDEX
AVAILABILITY OF ATMS PER 100,000 POPULATION



Though Saudi Arabia, South Africa and Turkey boast a smaller share of ATMs per person than found in other regions, research conducted in 2017 by London-based consulting firm RBR shows ATM usage is growing in the Middle East. The report found that ATM withdrawals are growing there, too, rising by 16 percent,[3] and specifically stated that demand for related services will continue for the next few years. This will likely remain true even as the availability of digital financial services increases.

The density of ATMs and bank branches per 100,000 people is also steadily rising, and could have a strong impact on continued cash use in the Middle East and South Africa.[4] Table 3 shows where Saudi Arabia, Turkey and South Africa currently fall in terms of ATM and bank branch availability.

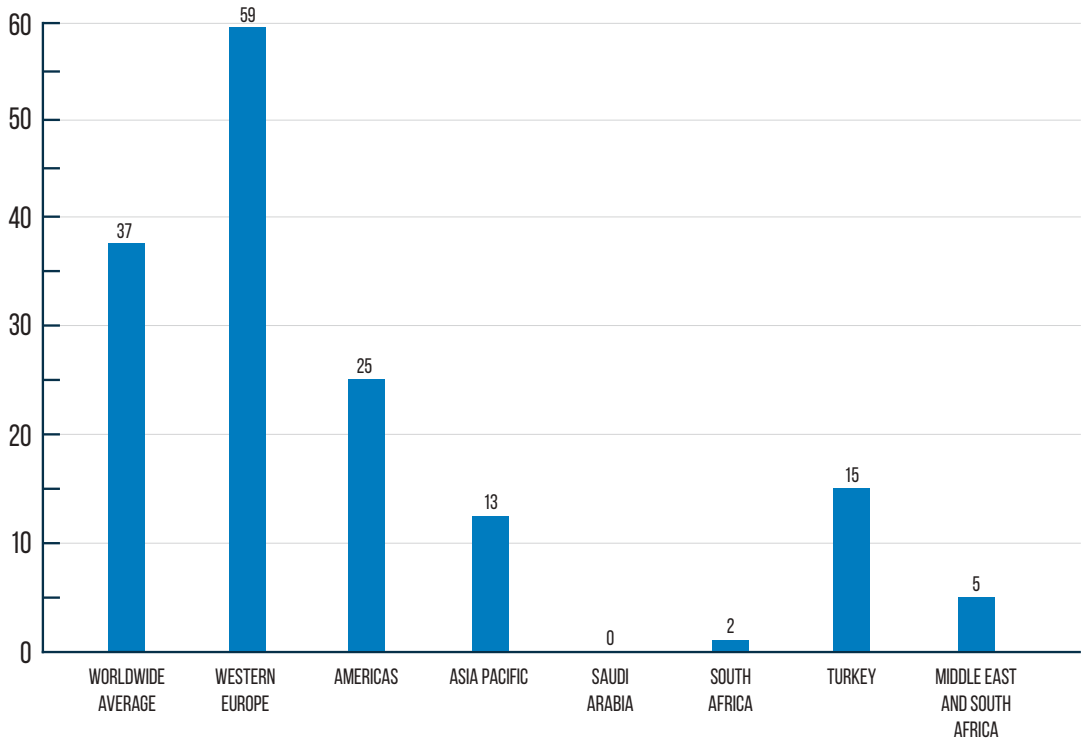
TABLE 3. COMPARISON OF ATM AND BANK BRANCHES AVAILABILITY INDEXES
ACCESSIBILITY OF ATMS AND BANK BRANCHES PER 100,000 PEOPLE

	WORLDWIDE AVERAGE	WESTERN EUROPE	AMERICAS	ASIA PACIFIC	SAUDI ARABIA	SOUTH AFRICA	TURKEY	MIDDLE EAST AND SOUTH AFRICA
ATM Index	27.7	32.9	32.0	38.9	18.0	16.6	20.0	18.2
Bank Branches Index	37.5	58.8	25.2	13.5	0.0	1.5	14.8	5.4
Population (millions)	109.1	26.4	217.3	481.8	31.7	55.6	79.8	55.7
POS per 100,000	3,002.9	4,751.2	1,598.9	2,300.9	870.0	724.0	2,943.7	1,512.6
ATM per 100,000	78.3	88.8	58.5	101.7	56.3	53.3	60.7	56.8
Bank Branches per 100,000	27.1	37.7	20.6	14.0	6.4	7.3	14.7	9.5
GDP per capita	33,008.4	49,188.7	27,962.1	30,267.8	20,317.4	89,99.8	19,773.8	16,363.7
Cash Share	27%	13%	20%	21%	38%	59%	24%	40%

[3] Author unknown. Financial inclusion drives worldwide ATM usage. RBR. 2017. https://www.rbrlondon.com/wp-content/uploads/2018/01/GA21_Press_Release_030217.pdf. Accessed September 2018.
[4] Bech, M; Faruqui, U; Ougaard, F. and Picillo, C. Payments are a-changin' but cash still rules. BIS. 2018. https://www.bis.org/publ/qtrpdf/r_qt1803g.pdf. Accessed September 2018.

A rising number of bank branches in the Middle East, as shown in Figure 5, could also contribute to the region's projected growth in cash usage. Like ATMs, bank branches provide points at which underbanked consumers can access financial services without losing their preference for cash. An increase in the number of bank branches also provides greater opportunities for consumers who already have bank accounts to access their funds.

FIGURE 5. BANK BRANCHES AVERAGE INDEX
AVERAGE BANK BRANCH AVAILABILITY BY 100,000 POPULATION



Given that bank branch and ATM availability is key for cash usage, it's important to consider the other factors affecting each of the three focus markets. Cash is projected to play a strong role in their future financial ecosystems, but it's not without its challengers.

THE STATE OF CASH
IN SAUDI ARABIA

Saudi Arabia will likely see an increase in cash usage as its GDP continues to grow, but three distinct factors are at play. A large number of card and mobile payment options are emerging, the country has a larger unbanked population than either Turkey or South Africa and its GDP is somewhat tied to the price of oil — and therefore slightly more volatile — than that of other countries.

As one of the largest economies in the Middle East, Saudi Arabia is experiencing a shift in its payment ecosystem. A rise in payments infrastructure, if not necessarily adoption, is currently taking place, particularly in card availability, which saw an 81 percent per capita increase between 2008 and 2016.[5] Saudi Arabia is also seeing more mobile payments, like mada Pay, an Android-based app that recently became the first in-country app to support near-field communication (NFC) transactions.[6]

Mobile payment adoption, especially over point-of-sale (POS) payment systems, is slow, and circulation does not appear to be negatively impacted by the alternatives' growing popularity. In other words, neither card nor mobile payments seem to be significantly affecting Saudi Arabian consumers' cash use.

The nation's cash use, cash share and GDP are also heavily tied to oil prices, and consumers generally feel more comfortable with paper currency on hand in case of price reductions or recessions. Figure 6 outlines the relationship between oil prices and cash share over a 10-year period.[7] Cash share was at approximately 28 percent in 2013, and a dip in prices led it to grow to 32 percent in 2014 and 39 percent in 2015.

[5] Author unknown. Payment, clearing and settlement statistics. BIS. 2016. https://www.bis.org/statistics/payment_stats.htm?m=6%7C36. Accessed September 2018.
[6] Author unknown. Visa and Saudi mada partner to launch new mobile-based application, mada Pay. Thomson Reuters Zawya. 2017. https://www.zawya.com/mena/en/story/Visa_and_Saudi_mada_partner_to_launch_new_mobilebased_application_mada_Pay-ZAWYA20180715083504/. Accessed September 2018.
[7] DiChristopher, Tom. Saudi Arabia cuts oil production in July despite OPEC agreement in hike output. CNBC. 2018. https://www.cnbc.com/2018/08/13/saudi-arabia-cuts-oil-production-despite-agreement-to-hike-output.html. Accessed September 2018.

FIGURE 6. OIL PRICES AND INTERNATIONAL CASH SHARE[8]
RELATIONSHIP BETWEEN OIL PRICES, CASH SHARE

Turkey and South Africa may not share Saudi Arabia's oil price ties, but all three are experiencing significant financial ecosystems changes. This is especially true in South Africa.

[8] Author unknown. IMF primary commodity prices. Bank for International Settlements. 2018. https://www.imf.org/external/np/res/commod/index.aspx. Accessed September 2018.

STATE OF CASH IN SOUTH AFRICA

South Africa's high cash share is expected to change minimally in the next couple of years, though its cash usage is expected to increase alongside its GDP. The country does appear to be adopting digital payments a little more quickly than the other two analyzed markets, however.[9]

This doesn't necessarily negate the use of cash, but rather proves movement should be expected from the fastest-growing economy analyzed in this report. Seventy-five percent of South Africa's adults possess bank accounts, and such growth means consumers are changing how they look at money and their levels of spend.[10]

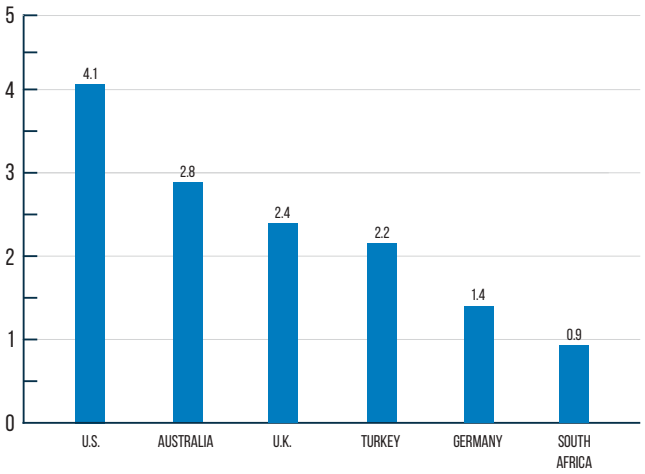
As with Saudi Arabia, payments structure change is a primary challenge to the country's cash usage. South Africa also has a large unbanked population — one with less access to ATMs and bank branches than the other nations considered, and, as shown in the Bank Branch Index (Figure 5) it came in with the second-lowest score.

South Africa is expanding its digital payments infrastructure for many reasons, including to combat cash fraud.[11] In 2017, 98 cash heists were reported — a 32 precent increase from 2016 figures.[12] Potential heist risks, and the fact that such attacks are becoming more militarized, have led many businesses and banks to explore card-based and digital payment options. That said, a large amount of cash is still in circulation — R130 billion per year, according to the South Africa Reserve Bank (SARB).[13]

When compared to Turkey, in Figure 7, South Africa appears to have fewer cards per market.[14]

Cash has shown resilience in South Africa. The country's cash usage is projected to increase through 2021, as is its ATM and bank branch availability. The latter should impact cash's role in the South African economy. Turkey, meanwhile, is overcoming its own payment obstacles.

FIGURE 7. CARDS PER CAPITA – 2016
RATE OF CARDS ISSUED BY MARKET



[9] Alkema, Peter. Moving towards a cashless society. Peter Alkema. 2017. https://www.peteralkema.com/moving-towards-a-cashless-society/. Accessed September 2018.
[10] Gaylard, Anton. The state of the cashless economy in Africa. Tech Central. 2017. https://techcentral.co.za/state-cashless-economy-africa/78316/. Accessed September 2018.
[11] Gaylard, Anton. The state of the cashless economy in Africa. Tech Central. 2017. https://techcentral.co.za/state-cashless-economy-africa/78316/. Accessed September 2018.
[12] Alkema, Peter. Moving towards a cashless society. Peter Alkema. 2017. https://www.peteralkema.com/moving-towards-a-cashless-society/. Accessed September 2018.
[13] Alkema, Peter. Moving towards a cashless society. Peter Alkema. 2017. https://www.peteralkema.com/moving-towards-a-cashless-society/. Accessed September 2018.
[14] NOTE: Credit card data for Saudi Arabia was unavailable.

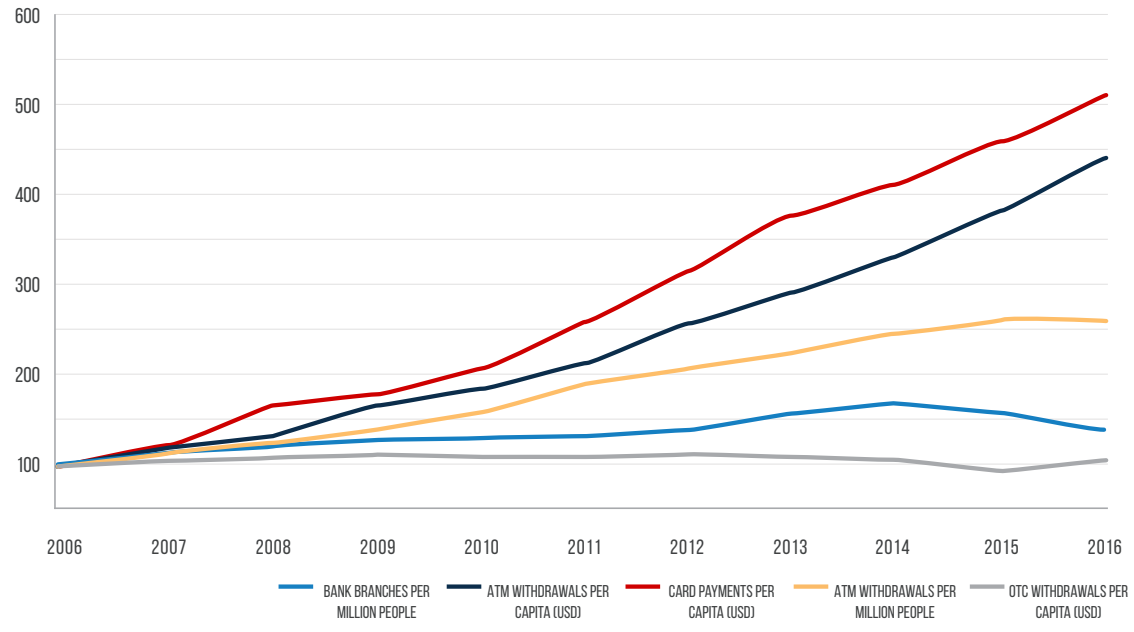
STATE OF CASH IN TURKEY

Like the other two countries analyzed in our report, Turkey's cash usage is projected to increase as its economy continues to thrive. The nation plans to add to the number of available ATMs and bank branches, too, furthering the availability of cash and other financial tools.

Card and mobile payments are on the rise in Turkey, and consumer behavior will be an important factor as payment preferences shift. In Turkey, the overall use of cash is being challenged by a growing card market and a young, tech-savvy population.[15]

That said, our research also found Turkish over-the-counter (OTC) withdrawals to be holding steady, particularly as ATM availability grows. Figure 8 shows that the ratio of in-country ATM terminals and withdrawals is increasing at a much higher rate than OTC withdrawals, however.

FIGURE 8. TURKISH PAYMENT AVAILABILITY
SHIFTING ACCESSIBILITY OF TURKEY'S FINANCIAL INFRASTRUCTURE



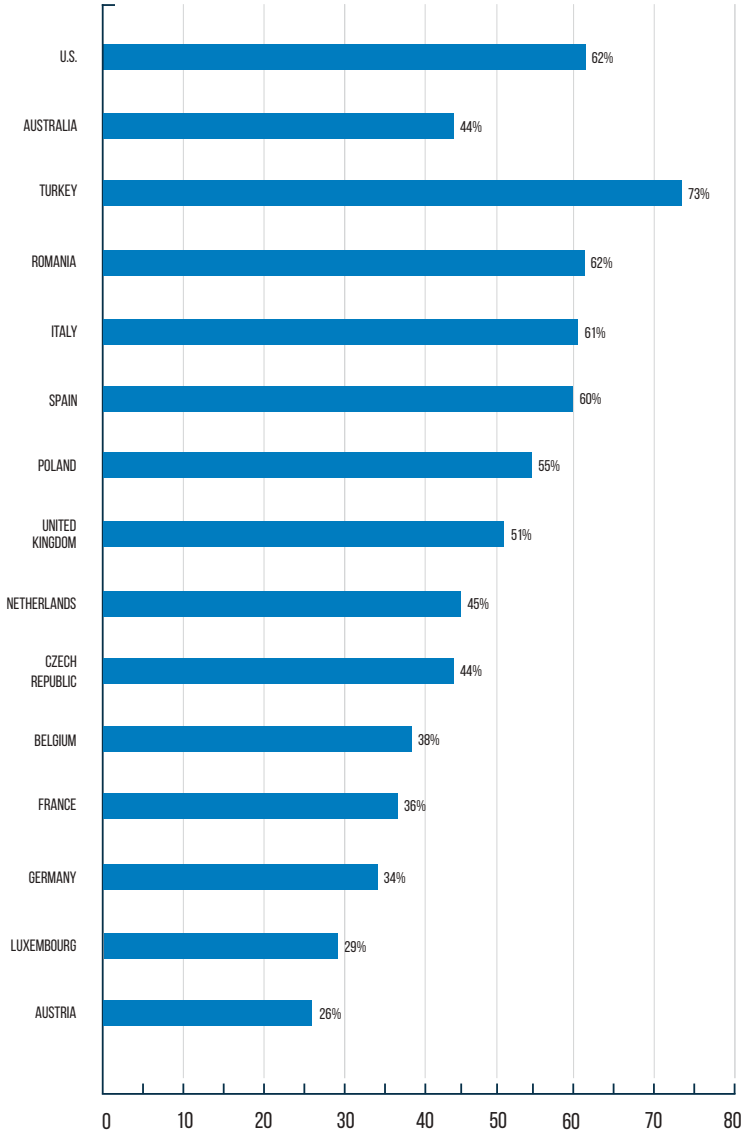
[15] Cowper, Bethen. Young consumers will push the Middle East away from 'cash on delivery' to electronic payments. Payments Source. 2017. https://www.paymentssource.com/opinion/want-to-offer-e-commerce-in-the-middle-east-embrace-cash-on-delivery. Accessed September 2018.

Turkey is one of the largest card markets in the Middle East, with 170 million in circulation as of 2016.[16] This figure is outstripped by just a few countries with higher populations, including the U.S. and China.

When compared to the rest of the Middle East and Africa, particularly Saudi Arabia and South Africa, Turkey's population is one of the youngest. Approximately half of its adults are under 30, and just 9 percent are older than 65.[17] Younger populations are typically more smartphone savvy — or at least more willing to adopt newer technologies — which could account for the country's increase in mobile banking.

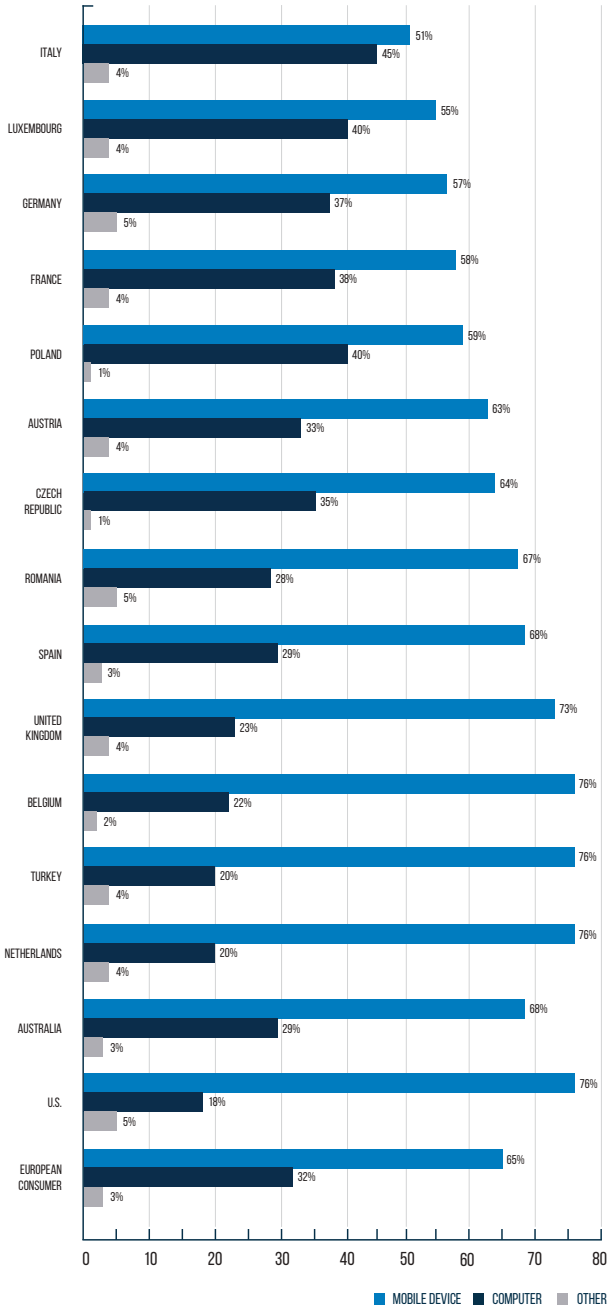
The numbers shown in Figure 9 are future projections, though, and thus subject to change. The rise of mobile payments does not mean fewer consumers are using cash or that it is growing less popular. In fact, it appears Turkish consumers are using their mobile banking tools much like those throughout the rest of the world.

FIGURE 9.COUNTRIES WHERE CONSUMERS EXPECT TO PAY MORE WITH THEIR SMARTPHONES[18]
CHANGING ATTITUDES ABOUT SMARTPHONE PAYMENT CAPABILITIES



[16] Author unknown. Cashless Turkey by 2023. Burnmark. 2017. https://bkm.com.tr/wp-content/uploads/2017/05/cashless-2023.pdf. Accessed September 2018.
[17] Author unknown. Cashless Turkey by 2023. Burnmark. 2017. https://bkm.com.tr/wp-content/uploads/2017/05/cashless-2023.pdf. Accessed September 2018.
[18] Author unknown. Mobile banking and shopping set to surge. ING. 2016. https://www.ing.com/Newsroom/All-news/Mobile-banking-and-shopping-set-to-surge.htm. Accessed September 2018.

FIGURE 10. OUTLETS CONSUMERS USED WHEN LAST CHECKING THEIR BANK INFORMATION[19]
PLATFORMS USED TO CHECK BANK INFORMATION BY NATION



Though Turkish consumers would consider using their smartphones for payments, it seems most are tapping them to simply check bank balances and find information (Figure 10). In addition, just half of the country's population has internet access, which eliminates mobile banking as an option for the other half.[20]

Paper currency in Turkey also contends with card payments' stronghold. As one of the largest card markets in the Middle East, Turkey's cash share was the lowest of the three countries analyzed.[21] That latter metric is expected to decline further, too, particularly as card payments — notably, the advance of those linked to its new Troy national payment system, introduced in 2016 — become even further embedded.[22]

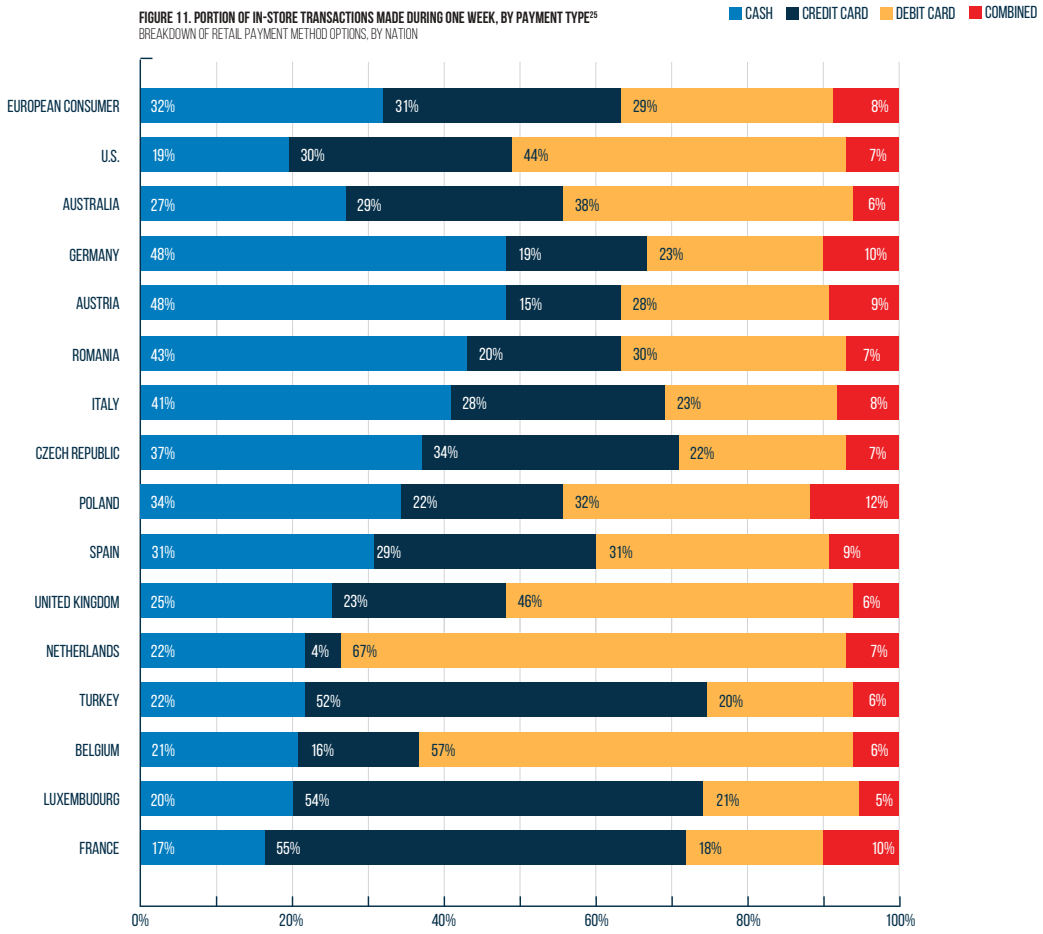
The Troy card payment system was established by Turkish payment services provider Bankalararasi Kart Merkezi A.S. (BKM). Its usage has been steadily expanding since its launch, with 2 million in circulation at the end of 2017. Turkey saw 12 million Troy transactions in that period worth approximately 3 million lira, and BKM aims to have 40 million Troy cards in circulation by 2022.[23] That's an ambitious goal, particularly when considering that significant parts of the population are still cash dependent.

[19] Author unknown. How do you prefer to pay? The latest trends in mobile banking. ING. 2018. https://think.ing.com/articles/mobile-money-still-on-the-rise-personal-finance-banking-spending-online-payment/. Accessed September 2018.
[20] Author unknown. Cashless Turkey by 2023. Burnmark. 2017. https://bkm.com.tr/wp-content/uploads/2017/05/cashless-2023.pdf. Accessed September 2018.
[21] Cowper, Bethen. Young consumers will push the Middle East away from 'cash on delivery' to electronic payments. Payments Source. 2017. https://www.paymentssource.com/opinion/want-to-offer-e-commerce-in-the-middle-east-embrace-cash-on-delivery. Accessed September 2018.
[22] Author unknown. Turkey's Troy enables mobile contactless payments. Finextra. 2018. https://www.finextra.com/pressarticle/72138/turkeys-troy-enables-mobile-contactless-payments. Accessed September 2018.
[23] Author unknown. Turkey's Troy enables mobile contactless payments. Finextra. 2018. https://www.finextra.com/pressarticle/72138/turkeys-troy-enables-mobile-contactless-payments. Accessed September 2018.

Turkey's increase in card usage is like that seen in Saudi Arabia, South Africa and other countries in the region. Data from the Bank for International Settlements (BIS) shows the typical, nominal value of a card payment is declining worldwide, however, even as card payments become more available. The average card transaction dipped from US$60 to US$40 in 2016, a change seen as consumers continue to use payment cards for ever-smaller purchases.[24] In Turkey, 52 percent of consumers used a credit card to make in-store purchases, behind only Luxembourg and France (Figure 11).

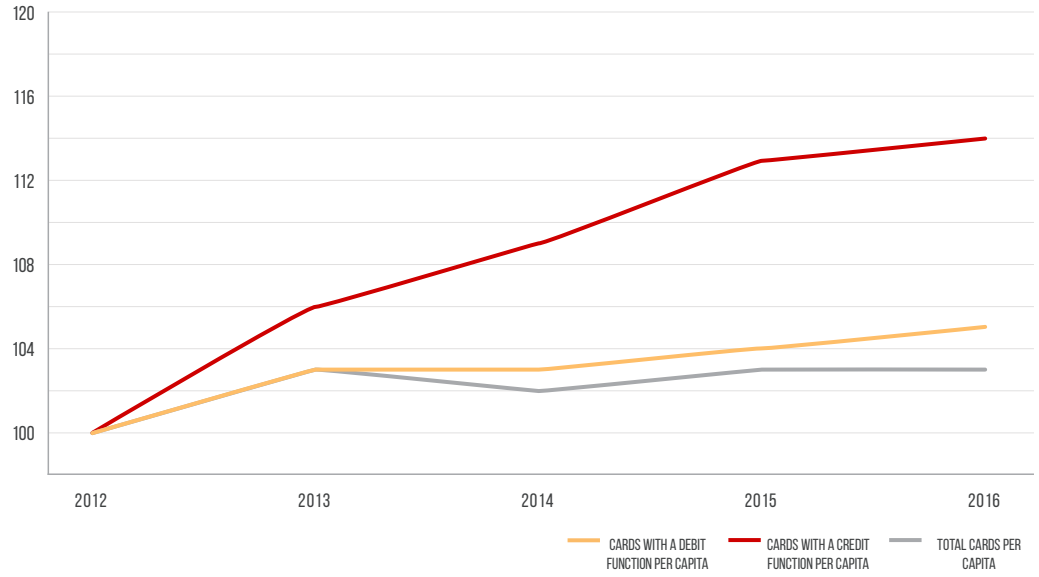
That said, cash in circulation is growing around the globe — including in the Middle East and Africa — despite the emergence of cards and digitization in countries like Turkey and South Africa. The highest upticks occurred in Hong Kong and Japan, but most nations reported higher rates when compared to themselves.[26]

FIGURE 11. PORTION OF IN-STORE TRANSACTIONS MADE DURING ONE WEEK, BY PAYMENT TYPE[25]
BREAKDOWN OF RETAIL PAYMENT METHOD OPTIONS, BY NATION



[24] Bech, M; Faruqui, U; Ougaard, F. and Picillo, C. Payments are a-changin' but cash still rules. BIS. 2018. https://www.bis.org/publ/qtrpdf/r_qt1803g.pdf. Accessed September 2018.
[25] Author unknown. How do you prefer to pay? The latest trends in mobile banking. ING. 2018. https://think.ing.com/articles/mobile-money-still-on-the-rise-personal-finance-banking-spending-online-payment/. Accessed September 2018.
[26] Bech, M; Faruqui, U; Ougaard, F. and Picillo, C. Payments are a-changin' but cash still rules. BIS. 2018. https://www.bis.org/publ/qtrpdf/r_qt1803g.pdf. Accessed September 2018.

FIGURE 12. EVOLUTION OF CARDS PER CAPITA
SHIFTS IN CREDIT, DEBIT CARD ACCESSIBILITY



Card availability in Turkey does not necessarily mean consumers are straying from cash. It may imply a preference for plastic, given how fast cards per capita have risen in the country, as shown in Figure 12.

Despite its high smartphone penetration rates, just half of Turkey's population has internet access. This gap means online and mobile banking are currently out of reach for half the country's citizens.[27]

Forty-three percent of Turkish adults lack access to formal bank accounts and their accompanying financial tools, making it unlikely that such a population will give up cash completely.[28] With such a significant share of the population left outside the digital payments infrastructure and with ATM terminals and withdrawals on the rise, it seems such technology likely won't impact cash usage in the country right away. The growing proliferation of smartphones gives consumers mobile access to account balances and information, but does not necessarily mean this group will quickly embrace mobile payments. Indeed, mobile POS (mPOS) payments are still rare outside of countries like China.

Growth in ATM and bank branch availability may allow more customers access to digital infrastructure, but a reliance on cash that's so ingrained in Turkey's unbanked and rural populations makes its usage difficult to shake. In other words, it appears cash has a long and bright future ahead within Turkey's borders.

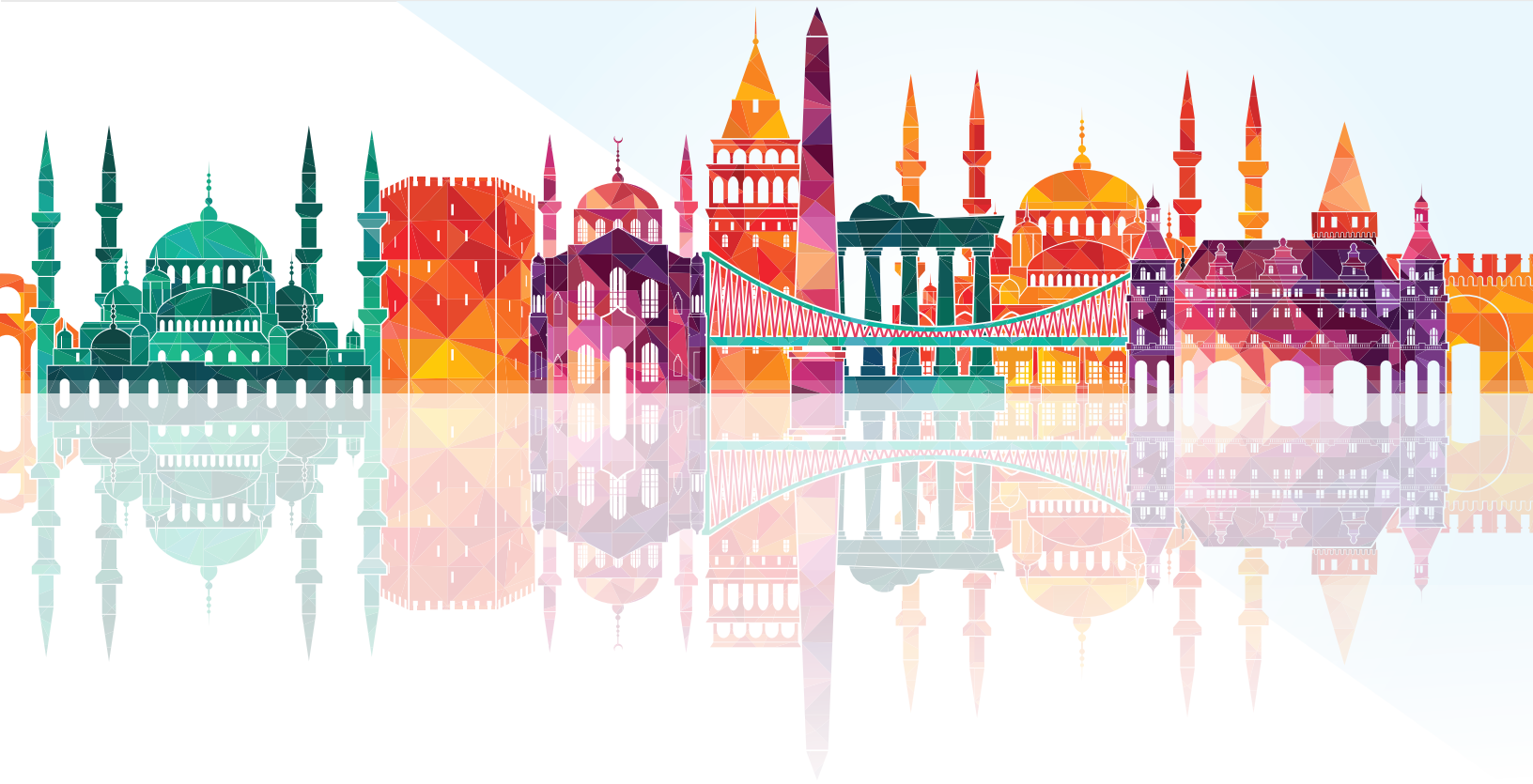
[27] Hunter, Simon. Spain losing €26bn in tax revenue due to fraud, says economists' report. El País. Jun 15, 2017. https://elpais.com/elpais/2017/06/15/inenglish/1497545884_038119.html. Accessed January 2018.
[28] De Wit, Richelle. Banks charging for cash withdrawals with card from different bank. Citizens Advice Bureau Spain. Mar. 24, 2015. https://www.citizensadvice.org.es/banks-charging-for-cash-withdrawals-with-card-from-different-bank/. Accessed January 2018.

CONCLUSION

Middle Eastern and South African institutions looking for decreasing cash reliance are likely in for a long wait. Cash's usage and presence still has a strong stance in the region, even as Saudi Arabia, South Africa and Turkey continue to update their digital payment ecosystems. Local consumers are gaining access to modern banking tools, but they don't seem to be replacing their cash payments with digital options just yet.

Those seeking to replace cash will need to battle populations with little access to formal banking and the consumer perception that paper currency is a safer asset in times of economic downturn or stress, as with volatile oil prices. As such, cash will likely stay rooted in the Middle East and South Africa for the foreseeable future.

CASH STILL HAS A LONG FUTURE IN TURKEY



The push to eliminate cash in Turkey faces a series of barriers, which complicates meeting the country's professed 2023 deadline to transition away from physical currency.

Though digital payments and mobile phone penetration have been strong across Turkey, there are still many instances where consumers prefer cash, according to Dr. Soner Canko, CEO of Turkish bank consortium Bankalararasi Kart Merkezi (BKM), or the Interbank Card Center. PYMNTS recently spoke with Canko for his insight into the state of cash in Turkey. While Turkey has made progress in its efforts to phase out cash, Canko acknowledged that it still plays a strong role in the nation's economy.

"People use cash mostly for micropayments. ... If they buy a newspaper [or a] magazine, [or] for taxi payments, open bazaars or fresh markets," Canko said.

Micropayments are the number one area where Turkish consumers still prefer cash. The average amount spent on these purchases may be small, but consumers might make several of these transactions every day. According to a 2016 report by the World Bank, more than 50 percent of all person-to-business payments in Turkey were made in cash.[29] Additionally, those who fall outside of Turkey's digital banking infrastructure exhibit a strong preference for cash.

"Cash usage is also very popular for the unbanked population; for example, people in rural areas [who] work as farmers. They always prefer [to use] cash because they're living in a shadow economy, in a gray economy," he said.

Where Does Turkey Stand With Cash?

This unbanked population accounts for 31 percent of the country's adults, and, according to BKM, its shadow economy accounts for approximately 30 percent of the country's overall GDP. In other words, nearly one-third of Turkey's population is more likely to use cash. But Turkey is

[29] Author unknown. Cash vs. Electronic Payments in Small Retailing. World Bank Group. 2016. http://pubdocs.worldbank.org/en/219031465585757849/WBG-Electronic-Payments-Small-Retailing.pdf. Accessed August 2018.

also home to a younger, tech-savvy population that is more likely to adopt modern payment solutions.

"In terms of inhabitants, our population in the region is considerably [large] — more than 80 million … and the population is young, and very much open to technology adaptation," Canko said. Approximately half of Turkey's population is under 30 years old, which means cash could see more competition as this group becomes more active in the economy.[30]

Turkey's economic situation is also different from nearby countries. Taking into account the average age, population size and technological availability, Turkey's economic position might be more similar to its European neighbors than that of the Middle East. Though it's still waiting to join to the European Union, Turkey has adopted many of its financial regulations.[31] These regulations, which allow digital solutions to thrive, could further challenge the use of cash.

> *"Cash usage in Turkey in the last thirty years has dramatically changed."*

What's Challenging Cash?

Consumers tend to prefer the convenience of cash for daily transactions, and digital payment providers are going to need to combat that if they want to change the way consumers pay. While there's been a proliferation of digital payment methods, at the end, the decision belongs to the customers and there is no guarantee these methods will be used. In 2016, BKM launched Troy, a domestic card scheme, with card provider Discover as its international partner. The Troy card is designed to encourage the rural and unbanked populations to more actively participate in Turkey's digital banking system.

"Cash usage in Turkey in the last thirty years has dramatically changed. We were purely a cash country thirty years ago, before we [introduced] debit and credit cards. That's changed daily consumer life dramatically," Canko said. Plastic payments have increased since 2002, as has average household consumption, which was at about 10 percent in 2002, and has increased to 40 percent in recent years.

Along with the availability of debit and credit cards, Turkish consumer have increased access to financial tools. There are 12,000 bank branches in Turkey, along with 52,000 ATMs, and this number is increasing.

"Bank branches are serving our cashless Turkey vision," Canko said. Though it should be noted that an increase in ATM availability does give customers more access to cash as well as additional financial services.

Lessons Learned From India

When it comes to Turkey's approach to digital money, it's looking to others for examples.

"There are bigger countries than us in terms of digital payments, such as South Korea, Sweden and China. We follow those countries [for digital payments], but we're also looking to countries like India," Canko said. "India [has] made a lot of radical progress in terms of cash demonetization, digital identity and [digital] wallet penetration."

[30] Devie Mohan. Cashless Turkey by 2023. Burnmark, BKM. May 2017. https://bkm.com.tr/wp-content/uploads/2017/05/cashless-2023.pdf. Accessed August 2018.
[31] Batchelor, Tom. Turkey still wants 'full membership' of the EU, Erdogan says. March 2018. https://www.independent.co.uk/news/world/europe/erdogan-turkey-eu-full-membership-europe-an-union-commitment-president-a8274166.html. Accessed August 2018.

Since 2016, when India issued a ban on its highest denomination notes, its demonetization has hit a few roadblocks, including resistance from consumers. In fact, India's cash usage is on track to reach $2.5 trillion by 2021, according to the PYMNTS Global Cash Index: India. Its demonetization could provide other countries with more insight into the complex role that cash plays in a national economy. For Turkey, Canko said, those insights mean BKM might approach things a little differently than India.

"What India did from a decision point of view is very good, but they made all of their actions in a very short period of time, putting the country into shock," he said. "So the lesson … is, whatever you do, make sure you have a sufficient timeline [for it]." Turkey uses India as a "benchmark" and that, similar to India, Turkey is targeting its unbanked population with the hope of increased support from regulatory bodies.

"What we see from benchmark countries is that government support is very important for cashless vision," Canko said, adding that the government's position on cash is "changing day-by-day."

Will Turkey Become Cashless By 2023?

Turkey started its demonetization efforts in 2010, and over the last eight years it's made several strides forward in digital and online banking. Despite the nation's efforts, going completely cashless will be challenging, and Canko acknowledged that the 2023 deadline is really more of a guideline.

"Having said that, we don't think it's going to be … 100 percent digital," Canko said. "What we believe is that it's going to be the moment [that] Turkey is using less cash than ever."

To that end, there are still instances where cash use may be the right choice for consumers.

"Zero cash is such a vision for society, but personally, I don't believe zero cash is necessary for any society," he said. "Zero cash is an aggressive target, but it doesn't mean that [it is] necessary."

Going 100 percent cashless would require greater digital infrastructure than Turkey currently possesses — each citizen would need 24/7 internet access, which is a difficult feat in any country. In other words, it looks like 2023 is unlikely to be the year that BKM will inspire Turkey to quit cash.

APPENDIX

METHODOLOGY AND DATA

The PYMNTS.com Global Cash Index, powered by Cardtronics, analyzes overall cash usage and projected trends over the next five years for 40 countries around the world that have provided sufficient data to make estimates on cash usage. These countries are divided into four regions — Western Europe, Eastern Europe, the Americas and Asia and Other — and we will publish reports reviewing cash share and usage focusing on one region each quarter. The four regions are as follows.

WESTERN EUROPE	EASTERN EUROPE	THE AMERICAS	ASIA AND OTHER
AUSTRIA	BULGARIA	UNITED STATES	AUSTRALIA
BELGIUM	CROATIA	MEXICO	CHINA
FINLAND	CZECH REPUBLIC	BRAZIL	INDIA
FRANCE	ESTONIA		JAPAN
GERMANY	GREECE		SOUTH KOREA
IRELAND	HUNGARY		SINGAPORE
ITALY	LATVIA		SAUDI ARABIA
LUXEMBOURG	LITHUANIA		SOUTH AFRICA
MALTA	POLAND		
NETHERLANDS	ROMANIA		
PORTUGAL	RUSSIA		
SPAIN	SLOVAKIA		
SWEDEN	SLOVENIA		
SWITZERLAND	TURKEY		
UNITED KINGDOM			

- The first factor is cash share, or the total amount of purchases made with cash. We measure cash share as the total amount of cash used by a country divided by the country's annual GDP. The total cash used by citizens of the country is assumed to be equal to the total amount of cash withdrawn at ATM machines plus the total amount of cash withdrawn OTC at bank branches in the country.
- The second factor is how the overall economy is growing. The total cash usage is estimated as the total cash share multiplied by the country's GDP. As a country's economy develops and grows, more overall spending occurs, which means more cash spending is occurring.

We have found that total cash share is decreasing in most countries. Because both population and GDP are growing, however, total cash usage is also still growing (albeit at rates lower than the GDP).

To calculate the results in this report, we performed the following for each country:

- Gathered historic and projected data.
- Estimated OTC cash withdrawals for countries that do not report this data.
- Calculated historic cash share.
- Estimated cash share for 2015 forward.
- Estimated total cash usage for 2015 forward.

Gathered historic and projected data.

We collected historic data for each country from 2000 to 2014, including information regarding total population, GDP, cash withdrawals from ATM and OTC, total card spending and payments infrastructure, such as the number of ATM machines and bank branches.[32] We also gathered data to project cash usage, including projected GDP and projected population by age group.[33]

We gathered data from 2000 through 2014 and used as much as was available. We have data on population and GDP for all years, and data on cash withdrawals and payments infrastructure for many but not all years.

For each country, we collected projections for the GDP and for population by age group. This data comes from the International Monetary Fund (IMF) and World Bank, respectively, and is from the same source as the historic data. Population projections are available every five years, and we used a linear interpolation for the years that are not reported. GDP projections are by year, and if we needed time periods beyond the last projected data point, we assumed that final GDP growth rate will be consistent over time.

Estimated OTC cash withdrawals for countries that do not report this data.

As described, cash share is defined as the total cash withdrawals from ATM machines plus total OTC cash withdrawals. We have selected the 40 countries in our analysis based on the availability of sufficient cash withdrawal data. The 40 included countries produced at least some data on the level of ATM withdrawals each year. If ATM withdrawals are not available, the country is excluded from our analysis.

While all 40 countries provided ATM data, only 12 provided data on OTC cash withdrawals. This means that for the other 28 countries, we had to estimate the level of OTC withdrawals. We did this by looking at each of our 28 target countries (the ones for which we need to estimate OTC withdrawals) and selecting a comparable country from the 12 countries that did provide data (we refer to these as our potential comparable countries).

The estimation procedure is done in the following four steps:

- **ONE:** Calculate the OTC-to-ATM ratio for each of the 12 potential countries that do provide OTC data. These are all potentially comparable countries. This is a simple calculation of dividing the level of OTC withdrawals by the level of ATM withdrawals for each year where data is available.
- **TWO:** Estimate the logarithmic trend of the OTC to ATM

[32] Data on Population is from the World Bank [http://data.worldbank.org/indicator/SP.POP.TOTL], Data on GDP is from the IMF [http://www.imf.org/external/ns/cs.aspx?id=28], and data on cash with drawals, card spending and the payments infrastructure is from the Bank of International Settlements [http://www.bis.org/cpmi/publ/d142.pdf] or from the European Central Bank [https://www.ecb.europa.eu/pub/pdf/other/art2_mb201104en_pp79-90en.pdf]

[33] Data on projected population is from the World Bank, and projected GDP is from the IMF. If these are the same, combine these footnotes into a single footnote.

ratio from 2000 through 2014 for each of the potentially comparable countries.[34]

We do this to remove any data jumps or movements that are

$$\overline{\left(\frac{OTC}{ATM}\right)_{Year}} = \propto + \beta \times LN(Year) + \varepsilon$$

due to factors specific to the country. This trend gives us a complete trend of the OTC to ATM ratio for each year from 2000 through 2014.

- **THREE:** Select the potential comparable country. For each country that does not have OTC data (target country), we select the most comparable country from the list of countries that do provide OTC data. This country is selected by comparing the trends and levels in five different variables:
  - ATM withdrawals as a percentage of GDP
  - Card spending as a percentage of GDP
  - Bank branches per 1,000 people
  - ATM terminals per 1,000 people
  - POS terminals per 1,000 people

For each potential comparable country, we calculate a difference in levels and a difference in changes over an eight-year period from 2006 to 2014. These are calculated as follows:

In the formula above, i is the year and "Variable" refers to

$$Difference\ in\ levels = \sqrt{\sum_{i=2006}^{2014} (Variable_{Comparable/i} - Variable_{Target/i})^2}$$

$$Difference\ in\ changes = \sqrt{\sum_{i=2006}^{2014} \left(\frac{Variable_{Comparable/i}}{Variable_{Comparable/i-1}} - \frac{Variable_{Target/i}}{Variable_{Target/i-1}}\right)^2}$$

each of the five variables listed above. We perform this calculation for each of the 28 target countries against each of the 12 potential comparable countries. This provides a difference in levels and a difference in changes for each of the five variables for each combination of a target country and comparable comparison country. We then assign a weight of two-thirds to the difference in levels and one-third difference in changes, and for each target and comparable country, we calculate a weighted average difference:

$$Weighted\ Average\ Difference_{ij} = 0.667 * Avg\ difference\ in\ levels + 0.333 * Avg\ difference\ in\ changes$$

In this equation, i is the target country and j is the comparable country.

For each target country, we then have a weighted average difference for each of the 12 potential comparable countries. The comparable country for each target is selected as the potential comparable country with the smallest difference for each target

[34] For three countries, the reduction in OTC-to-ATM ratio was so strong that we used a polinomial trend. These three countries were Latvia, Romania and Slovakia.

APPENDIX

country. The following table shows the comparable country selected for each of the 28 target countries.

NUMBER	TARGET	COMPARABLE
1	AUSTRALIA	UNITED KINGDOM
2	AUSTRIA	ITALY
3	BELGIUM	NETHERLANDS
4	BRAZIL	MALTA
5	BULGARIA	HUNGARY
6	CHINA	SLOVAKIA
7	CROATIA	MALTA
8	ESTONIA	NETHERLANDS
9	FINLAND	NETHERLANDS
10	FRANCE	ITALY
11	GREECE	HUNGARY
12	INDIA	SLOVAKIA
13	IRELAND	LATVIA
14	JAPAN	GERMANY
15	KOREA	UNITED KINGDOM
16	LUXEMBOURG	ITALY
17	MEXICO	CZECH REPUBLIC
18	POLAND	HUNGARY
19	PORTUGAL	UNITED KINGDOM
20	RUSSIA	ROMANIA
21	SAUDI ARABIA	SLOVAKIA
22	SINGAPORE	NETHERLANDS
23	SLOVENIA	HUNGARY
24	SOUTH AFRICA	SLOVAKIA
25	SWEDEN	NETHERLANDS
26	SWITZERLAND	NETHERLANDS
27	TURKEY	MALTA
28	UNITED STATES	UNITED KINGDOM

- **FOUR:** Calculate the estimated level of OTC withdrawals for the target country. We have 28 target countries for which we are estimating the level of OTC withdrawals. For nine of these countries, we do have data on the OTC-to-ATM ratio for a single year but have no other data that can allow us to understand how it's trending.

  For these countries, we adjust the value of $\overline{\left(\frac{OTC}{ATM}\right)_{Year}}$ such that it matches the known OTC-to-ATM ratio. This has the result of shifting the OTC-to-ATM ratio for every year up or down such that our estimated trend line passes through the known point. For the other 19 countries, we assume that this adjustment is equal to zero or that the OTC-to-ATM ratio for the selected comparable country is the same as the OTC-to-ATM ratio for the target country.

  For each target country, we then take this adjusted value of $\overline{\left(\frac{OTC}{ATM}\right)_{Year}}$ for the selected comparable country and use it to calculate the level of OTC withdrawals for each from 2000 through 2014.

$$OTC\ Withdrawals_{Year} = \overline{\left(\frac{OTC}{ATM}\right)_{Year}} \times ATM\ Withdrawals_{Year}$$

  The following table identifies the 12 countries for which OTC data is reported, the nine countries for which we have to estimate the trend based on a comparable country but for which we do have a single known data point to set the level of OTC withdrawals, and the 19 countries for which the trend and OTC-to-ATM ratio are derived from the comparable country.

ASIA AND OTHER

NO	COUNTRY	SOURCE OF OTC DATA		
		OTC DATA AVAILABLE	KNOWN DATA POINT	VALUE IS DERIVED
1	AUSTRALIA		✓	
2	CHINA			✓
3	INDIA			✓
4	JAPAN			✓
5	SOUTH KOREA			✓
6	SINGAPORE			✓
7	SAUDI ARABIA			✓
8	SOUTH AFRICA			✓

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WESTERN EUROPE

NO	COUNTRY	SOURCE OF OTC DATA		
		OTC DATA AVAILABLE	KNOWN DATA POINT	VALUE IS DERIVED
1	AUSTRIA			✓
2	BELGIUM			✓
3	FINLAND		✓	
4	FRANCE		✓	
5	GERMANY	✓		
6	IRELAND		✓	
7	ITALY	✓		
8	LUXEMBOURG			✓
9	MALTA	✓		
10	NETHERLANDS	✓		
11	PORTUGAL		✓	
12	SPAIN	✓		
13	SWEDEN		✓	
14	SWITZERLAND			✓
15	UNITED KINGDOM	✓		

EASTERN EUROPE

NO	COUNTRY	SOURCE OF OTC DATA		
		OTC DATA AVAILABLE	KNOWN DATA POINT	VALUE IS DERIVED
1	BULGARIA			✓
2	CROATIA		✓	
3	CZECH REPUBLIC	✓		
4	ESTONIA			✓
5	GREECE			✓
6	HUNGARY	✓		
7	LATVIA	✓		
8	LITHUANIA	✓		
9	POLAND			✓
10	ROMANIA	✓		
11	RUSSIA			✓
12	SLOVAKIA	✓		
13	SLOVENIA		✓	
14	TURKEY			✓

AMERICAS

NO	COUNTRY	SOURCE OF OTC DATA		
		OTC DATA AVAILABLE	KNOWN DATA POINT	VALUE IS DERIVED
1	UNITED STATES		✓	
2	MEXICO			✓
3	BRAZIL			✓

Calculated historic cash share.

The cash share is defined as the total cash spending divided by the GDP. In this sense, cash usage is relative to the overall size of the economy. Total cash spending is defined as ATM withdrawals plus OTC withdrawals. Total cash share is calculated as follows:

$$Cash\ Share_{Year} = \frac{ATM\ Withdrawals_{Year} + OTC\ Withdrawals_{Year}}{GDP_{Year}}$$

Estimated cash share for 2015 forward.

The cash share is estimated as a logarithmic trend of the historic data. We then estimate the log trend and adjust the line such that it lines up with the historic data for 2014. This creates a naïve historic cash share trend starting at the historic cash share for 2014, rolling forward for five or 10 years.

We then adjust this naïve cash share based on the demographic trends in the country and the likelihood that younger demographics will be more prone to shift away from cash to new payment methods such as mobile wallets or other new technologies that are becoming available. This adjustment analyzes the proportion of the population that is younger and accounts for the relative amount of spending (because younger people generally earn and spend less than older people). This analysis suggests that the actual cash share is likely to be lower than the naïve cash share estimated above once we take these factors into account.

This analysis results in a projected cash share that is less than the cash share projected using the naïve analysis described above.

Estimated total cash usage for 2015 forward.

The total cash usage is calculated by multiplying the adjusted cash share by the projected GDP for each year, 2015 through 2020.

ATM AND BANK BRANCH
AVAILABILITY INDEXES

We have created two indexes based on the availability of ATMs and bank branches per 100,000 people in the following countries. To do this, we used economy data and population data from 40 nations, delineated below:

- AUSTRALIA
- AUSTRIA
- BELGIUM
- BRAZIL
- BULGARIA
- CHINA
- CROATIA
- CZECH REPUBLIC
- ESTONIA
- FINLAND
- FRANCE
- GERMANY
- GREECE
- HUNGARY
- INDIA
- IRELAND
- ITALY
- JAPAN
- LATVIA
- LITHUANIA
- LUXEMBOURG
- MALTA
- MEXICO
- NETHERLANDS
- POLAND
- PORTUGAL
- ROMANIA
- RUSSIA
- SAUDI ARABIA
- SINGAPORE
- SLOVAKIA
- SLOVENIA
- SOUTH AFRICA
- SOUTH KOREA
- SPAIN
- SWEDEN
- SWITZERLAND
- TURKEY
- UNITED KINGDOM
- UNITED STATES

The indexes consider the availability of ATM and bank branches per 100,000 inhabitants in each country. The maximum value an index can achieve is 100 points and zero is the minimum. Each country has been assigned its own score.

We show how we calculated both indexes for each country in the following table. We first obtained the number of ATM and bank branches present per 100,000 people, then took the lowest and the highest number for each index and labeled them 0 and 100, respectively. The rest of the numbers were calculated according to the following equation:

$$Index_i = \frac{x_i - x_{Min}}{x_{Max} - x_{Min}}$$

In this formula, x represents the number of ATM and bank branches per 100,000 people and i represents each country that was neither a minimum nor a maximum score.

COUNTRY	ATM PER 100,000	BANK BRANCHES PER 100,00	INDEX	
			ATM	BANK BRANCHES
AUSTRALIA	132.3	22.89	51.9	27.3
AUSTRIA	156.1	47.49	62.6	67.8
BELGIUM	139.7	31.33	55.2	41.2
BRAZIL	81.4	—	29.1	—
BULGARIA	79.2	51.61	28.1	74.6
CHINA	63.1	—	20.9	—
CROATIA	—	27.84	—	35.4
CZECH REPUBLIC	43.6	19.68	12.2	22.0
ESTONIA	61.0	8.15	20.0	3.0
FINLAND	37.3	19.21	9.3	21.2
FRANCE	96.1	58.45	35.7	85.9
GERMANY	104.5	41.43	39.5	57.8
GREECE	62.8	23.42	20.8	28.2
HUNGARY	48.9	29.38	14.5	38.0
INDIA	16.4	11.15	0.0	7.9
IRELAND	56.9	22.20	18.1	26.1
ITALY	81.6	50.13	29.2	72.2
JAPAN	107.7	—	40.9	—
LATVIA	53.3	13.90	16.5	12.5
LITHUANIA	41.9	19.21	11.4	21.2
LUXEMBOURG	92.0	39.61	33.9	54.8
MALTA	49.9	25.53	15.0	31.6
MEXICO	37.9	10.61	9.6	7.0
NETHERLANDS	41.4	10.42	11.2	6.7
POLAND	56.3	37.64	17.9	51.6
PORTUGAL	149.5	53.81	59.6	78.2
ROMANIA	57.9	24.91	18.6	30.6
RUSSIA	89.5	26.24	32.7	32.8
SAUDI ARABIA	54.9	6.34	17.2	0.0
SINGAPORE	50.8	8.51	15.4	3.6
SLOVAKIA	50.4	23.80	15.2	28.8
SLOVENIA	81.9	28.55	29.3	36.6
SOUTH AFRICA	52.7	7.37	16.2	1.7
SOUTH KOREA	239.7	14.84	100.0	14.0
SPAIN	107.5	67.01	40.8	100.0
SWEDEN	31.9	—	6.9	—
SWITZERLAND	84.6	29.76	30.5	38.6
TURKEY	62.1	15.79	20.5	15.6
UNITED KINGDOM	108.2	30.00	41.1	39.0
UNITED STATES	—	34.83	—	47.0

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