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1. Introduction

Financial inclusion—the availability and accessibility of affordable and responsible financial services for individuals and businesses—has become a fundamental enabler of sustainable economic development. It not only provides households with tools to manage their finances but also promotes entrepreneurship, resilience, and equitable growth. However, despite global initiatives and rapid technological advancement, vast disparities in financial access persist, particularly between high-income and low-income economies (World Bank, 2022). The study uses Power BI to analyse World Bank data (2025) focusing on account ownership, saving, borrowing and digital finance.

The World Bank's *Global Findex Database (2025)* offers a comprehensive foundation for investigating these disparities. It captures detailed indicators of how adults worldwide save, borrow, make payments, and manage risk, providing an unprecedented lens into financial inclusion across 140 economies. The dataset enables comparative analysis of socioeconomic, regional, and digital factors that shape access to financial systems.

The digital transformation of finance—particularly the growth of mobile money, digital accounts, and electronic payment systems—has redefined the boundaries of financial inclusion. Studies such as Jack and Suri (2014) demonstrate that mobile money systems can dramatically improve financial access, especially in developing economies. Similarly, Demirgüç-Kunt et al. (2022) found that digital finance has accelerated inclusion in regions where traditional banking infrastructure remains weak. Nevertheless, uneven technological adoption and economic inequality continue to restrict progress (Sahay et al., 2015).

This report leverages the Global Findex Database to explore the determinants of financial inclusion across regions and income groups, using Power BI as a visual analytics and business intelligence tool. The analysis focuses on uncovering patterns in account ownership, saving and borrowing behaviours, and digital finance adoption. Through interactive dashboards, it identifies how digital transformation may mitigate financial inequality and highlights which regions or income classifications lag.

The guiding research question for this project is:

How do regional and income-level differences influence financial inclusion, and what role does digital finance play in reducing these disparities globally?

So, in this project, we aim to:

1. Identify variations in financial inclusion indicators (account ownership, savings, borrowing, and digital account usage) across world regions and income levels.
2. Analyse the socioeconomic and digital factors that explain these differences.
3. Evaluate the role of mobile and digital technologies in enhancing financial inclusion.
4. Visualise the results using Power BI dashboards to communicate findings effectively.

By integrating descriptive analytics, business intelligence, and academic insight, this project contributes to a deeper understanding of how financial and technological ecosystems interact. The findings will provide evidence-based insights for policymakers, financial institutions, and researchers, emphasising the crucial role of digital finance in achieving the United Nations Sustainable Development Goals (SDGs), particularly SDG 1 (*No Poverty*), SDG 5 (*Gender Equality*), and SDG 8 (*Decent Work and Economic Growth*) (United Nations, 2015). Plus, we evaluate both cross-section patterns (Year = 2024) and trends where years are available, so that the conclusion can speak directly to the aim.

2. Background

2.1 Global Context of Financial Inclusion

Financial inclusion has emerged as a global policy priority, representing both an economic and social challenge. According to the World Bank (2022), approximately 76% of adults worldwide hold an account, yet significant gaps remain—particularly in Sub-Saharan Africa and South Asia, where gender, education, and income disparities persist. These inequalities hinder equitable participation in the global economy and limit individuals' ability to accumulate wealth or withstand financial shocks.

The rise of digital technologies—especially mobile banking and fintech solutions—has transformed traditional models of financial access. Mobile money platforms have become key vehicles for extending financial services to the unbanked, especially in developing economies. Jack and Suri (2014) highlighted Kenya's M-Pesa as a landmark example of how mobile finance can reshape inclusion, while Beck and Demirgüç-Kunt (2008) noted that access to finance correlates strongly with macroeconomic stability and reduced income inequality.

2.2 The Global Findex Dataset

We use the LMS-supplied Global Findex Database 2025 file as our dataset. In this dataset, indicators cover 2011–2024, and not all indicators are available for every year. For example, MobileAccount is present for 2014, 2017, 2021, 2022, and 2024 only. To keep comparisons consistent, we treat 2024 as the common cross-sectional baseline and use earlier years as contextual trend evidence where available.

2.3 Research Significance

This study focuses on understanding *why* and *how* disparities in financial inclusion persist, rather than merely describing them. It contributes by combining quantitative analysis with interactive visualisation, enabling patterns to be interpreted intuitively. The approach demonstrates how business intelligence platforms like Power BI can bridge the gap between complex datasets and actionable insights.

From a policy standpoint, these findings are significant. They can inform international organizations and governments in designing targeted interventions—such as expanding digital payment systems or subsidising mobile network infrastructure—to close inclusion gaps. In doing so, the project aligns with the IMF’s financial inclusion framework, which emphasises the link between inclusive finance, economic stability, and productivity growth (Sahay et al., 2015). It is hypothesized that digital finance positively correlates with inclusion, especially in lower-income regions.

3. Methodology

The methodological framework combines data cleaning, transformation, modelling, and visualisation within Power BI Desktop. The process follows a structured business intelligence workflow designed to ensure accuracy, reproducibility, and analytical depth.

3.1 Data Preparation and Import

The raw dataset GlobalFindexDatabase2025.csv was imported into Power BI using the *Get Data* function. Automatic data type detection was reviewed, and all transformations were performed in *Power Query Editor* to maintain transparency. This ensured that each variable was correctly recognised by Power BI before any transformation was applied. A supplementary glossary file (*GlobalFindex2025-glossary.xlsx*) was used to validate variable definitions, confirm data consistency, and ensure correct data-type assignment during import.

This glossary served as the project's data dictionary, aligning variable names with their conceptual meanings and measurement units. The summarised data dictionary is presented in **Appendix B** for reference.

Each observation represents a unique combination of country, region, and year. Quantitative variables express proportions (0–1) for financial inclusion metrics, while categorical variables identify geographic or income classifications.

3.2 Data Cleaning and Transformation

Data cleaning was critical to ensuring analytical reliability and compliance with academic standards (Knafllic, 2015). The following steps are executed in Power Query and applied consistently across visuals:

1. **Replacing Missing Values:**

All instances of “NA” and “N/A” were replaced with null values. This step ensured correct recognition of missing data and prevented misclassification as text.

2. **Removing Columns with High Null Ratios:**

Columns exceeding 80% null values were eliminated using *Remove Columns* to reduce dataset complexity and focus on meaningful attributes. (see Figure 1 in Appendix A)

3. **Handling Conversion Errors:**

Numeric fields (e.g., *fiaccount_t_d*, *saved_any_t_d*) initially contained <1% type conversion errors. These were replaced with nulls to preserve integrity. (see Figure 2, 3 in Appendix A)

4. **Text Normalisation (region labels):**

Redundant phrases (e.g., “excluding high income”) were removed from *regionwb24_hi* to standardise category names. The *regionwb24_hi* column contained the phrase “(excluding high income)”, which was removed using the *Replace Values* feature in Power Query.

This transformation simplified regional labels and enhanced readability without affecting the accuracy of the region classification. (see Figure 4 in **Appendix A**)

5. **Data Type Verification:**

- Text: *countrynewwb*, *regionwb24_hi*, *incomegroupwb24*
- Decimal (0–1 proportions): *account_t_d*, *fiaccount_t_d*, *mobileaccount_t_d*, *saved_any_t_d*, *borrow_any_t_d*, *dig_acc*
- Whole Number: *year*

Validation confirmed all indicators were within the expected 0–1 range.

6. Final Validation:

Power BI's *Column Quality* and *Distribution* tools verified that valid entries exceeded 80%. Duplicates were checked across all columns, and none were found. The cleaned dataset was thus consistent, complete, and ready for modelling (see Figure 5 in Appendix A)

Reproducibility note. Percentage-type fields are aggregated as Average (not Sum) across visuals. The Year slicer is single-select and affects snapshot visuals only; trend visuals are explicitly set to ignore Year via Edit interactions. Figure captions record active slicer states (Year/Region/Income), enabling the analysis to be reproduced directly from the dashboard.

Detailed cleaning steps and corresponding screenshots are provided in **Appendix A**.

3.3 Data Modelling

The cleaned data followed a flat table structure, appropriate for Power BI's analytical engine. Although only one primary table was used, implicit hierarchies (Region → Country → Year) were established through slicers and field groupings, enabling users to drill down into specific patterns.

To support quantitative analysis, several calculated DAX measures were created:

- AvgAccount = AVERAGE('GlobalIndex'[account_t_d])
- MobileUsageRate = AVERAGE('GlobalIndex'[mobileaccount_t_d])
- DigitalInclusion = AVERAGE('GlobalIndex'[dig_acc])
- SavingsBorrowRatio =
DIVIDE(AVERAGE('GlobalIndex'[saved_any_t_d]),
AVERAGE('GlobalIndex'[borrow_any_t_d]))

These measures facilitated cross-country comparisons and helped quantify the relationship between income, region, and digital adoption. (see **Appendix B**)

3.4 Dashboard design and interaction

The build uses one interactive dashboard page with six core visuals—KPI cards, a regional column chart, an income group comparison, a payment preference donut, a country map, and a summary table—plus filtered views captured as comparative figures. Slicers (Region, Income, Year) drive all visuals with consistent filters. For trends, we add a line visual that uses all available years while ignoring the Year slicer.

The figure set follows a guided order: KPI → Region → Income/Channels → Map → Table → Trends, with additional regional cuts (EAP, ECA, MENA) shown as separate figures for clarity.

Note. The report does not rely on a separate “Savings–Borrowing scatter” page. Behavioural evidence is shown through the emergency-funds bar visual and channel mix, which are better aligned with the dataset used here.

3.5 Validation and Quality Assurance

Quality control was performed at both the data and dashboard levels:

- Cross-validation: Figures were compared with published World Bank data (2022) Findex tables for accuracy.
- Functionality testing: Filters, slicers, and tooltips were tested for logical behaviour.
- Clarity assessment: Each visual was evaluated for readability, data-label consistency, and absence of distortion.

This structured approach ensures analytical rigor and aligns with professional business intelligence practices. By integrating robust data cleaning, modelling, and visual design, the final dashboard effectively communicates complex global patterns in financial inclusion. These validation procedures ensure that subsequent analyses and visual interpretations are both accurate and reliable.

4. Solution

Because some indicators are not recorded every year, we use 2014–2024 for mobile-related trends and 2011–2024 for account ownership where available; all cross-section insights use 2024 for comparability.

How to read the dashboard.

- Fig.1 is the full-dataset dashboard (2011–2024).
- Figs.2–10 are interactive cross-sections filtered to Year = 2024.
- Fig.3 is a timeline for MobileAccount with non-continuous years from the source CSV (2014, 2017, 2021, 2022, 2024).
- Figs.11–12 compare 2017 for East Asia & Pacific (EAP) and Europe & Central Asia (ECA).
- Figs.13–15 show long-span cuts (2011–2024) for EAP, ECA, and Middle East & North Africa (MENA).
- Slicers (Region, Income group, Year) recompute all visuals consistently.

4.1 Global snapshot and trend

Finding 1 — Inclusion rose and mobile adoption accelerated (Figs.1, 3, 4).

Claim. By 2024, basic inclusion improved and mobile adoption grew faster.

Evidence. Fig.1 cards (full dataset) show Account Ownership 61%, Inactive 8%, MobileAccount 28%. The 2024 cards in Fig.4 read 70%, 9%, and 34%. Fig.3 shows MobileAccount rising from 2014 to 2024, with a dip in 2022 and a rebound in 2024.

Reasoning. Mobile money and wallet rails expanded faster than traditional banking access.

Limitation. Timeline years are not continuous, so we focus on direction rather than exact year-over-year rates.

Implication. Use 2024 as the core baseline for cross-section analysis; read earlier years as context.

4.2 Regional structure (cross-section 2024)

Finding 2 — Mobile leads in SSA; MENA lags; EAP and ECA are in the middle (Fig.5).

Claim. Digital rails differ by region.

Evidence. In Fig.5 (2024), Sub-Saharan Africa has the tallest MobileAccount bars. MENA is the lowest. Across regions, CreditcardUser bars are smaller than MobileAccount.

Reasoning. SSA hosts mature mobile-money ecosystems. MENA remains more bank-centric.

Limitation. Values are regional averages; channels are not mutually exclusive.

Implication. Strategy must be region-specific: push mobile rails where they already work; cards alone are not enough in low-card markets.

Finding 3 — Emergency funds still rely on informal networks in many places (Fig.6).

Claim. Family and friends remain the primary channel for emergency cash in the countries shown.

Evidence. Fig.6 shows Family & Friends ≈ 0.44 – 0.73 across the listed countries, while WorkIncome ranges around 0.08 – 0.22 . Other channels are small.

Reasoning. When formal rails or trust are limited, social networks substitute for liquidity.

Limitation. The countries in the bar chart are examples, not a global mean.

Implication. Raising access alone is not enough. Usage design (cash-out points, micro-limits, dispute handling) is key for shock events.

Finding 4 — Payment preferences: COD still matters, but the mix varies by region (Figs.7, 13–15).

Claim. Online payments have scaled, yet COD remains meaningful and region-dependent.

Evidence. Fig.7 (2024) shows COD $\approx 33\%$ vs Paid online $\approx 17\%$ in that visual. In the long-span region cuts, ECA (Fig.14) shows Paid online $\approx 21\%$ and COD

≈ 17% (online > COD), while EAP (Fig.13) shows COD ≈ 33% and Paid online ≈ 17% (COD ≥ online).

Reasoning. Logistics, refunds, and card frictions keep COD alive even with rising inclusion.

Limitation. Donuts are not population-weighted.

Implication. To move users from COD to online, fix refund/chargeback flows and checkout UX, not only account opening.

Finding 5 — Government transfers with pensions are mostly banked; mobile is emerging in EAP (Figs.10, 13–15).

Claim. Banks dominate this use-case globally, with a clear regional exception.

Evidence. Fig.10 (2024 global table) totals: Bank 0.17, Cash 0.08, Card 0.01, Mobile 0.01. In EAP (Fig.13) the totals row shows Mobile 0.18—much higher than ECA (Fig.14) Mobile 0.03 and MENA (Fig.15) Mobile 0.01.

Reasoning. Governments prefer bank rails for reconciliation and compliance; where wallets are strong (EAP), mobile can serve the last mile.

Limitation. Totals reflect the countries present in the visual.

Implication. Prioritise bank-to-wallet interoperability for G2P in wallet-ready markets.

4.3 Regional deep-dive: 2017 vs 2024, plus decade views

Finding 6 — East Asia & Pacific: strong mobile gains; moderate access lift (Figs.11, 13).

Claim. Mobile adoption grew faster than account opening.

Evidence. 2017 (Fig.11): Account 52%, Inactive 6%, Mobile 13%. 2024 (Fig.13): Account 57%, Inactive 5%, Mobile 29%. So $\Delta\text{Mobile} = +16$ pp, $\Delta\text{Account} = +5$ pp.

Reasoning. Smartphones, super-apps, and QR rails reduced usage frictions.

Limitation. Country composition may vary across years.

Implication. In EAP, focus on activation and everyday use (KYC-light tiers, bill-pay, micro-savings).

Finding 7 — Europe & Central Asia: steady, bank-centric path (Figs.12, 14).

Claim. Access is stable; mobile grows but stays complementary.

Evidence. 2017 (Fig.12): Account 54%, Inactive 3%, Mobile 13%. 2024 (Fig.14): Account 55%, Inactive 3%, Mobile 21%. So $\Delta\text{Mobile} = +8$ pp, $\Delta\text{Account} = +1$ pp.

Reasoning. Mature card and bank rails dominate everyday payments.

Limitation. Sub-regional differences (EU vs non-EU) are averaged out.

Implication. Push account activation (salary deposits, utilities, subscriptions, open-banking UX) rather than wallets alone.

Finding 8 — Middle East & North Africa: lower levels on both access and mobile (Fig.15).

Claim. 2024 levels lag EAP and ECA.

Evidence. Fig.15 (2024): Account 38%, Inactive 10%, Mobile 14%.
Emergency funding still leans on Family & Friends in the countries shown.

Reasoning. Bank-centric systems and uneven mobile acceptance slow digital use.

Limitation. Outcomes vary by country.

Implication. Pair ID rails and agent networks with regulatory sandboxes to reduce onboarding friction.

4.4 Income mix and digital use (Figs.8, 13–15)

Claim. Digital use rises with income, but the online vs COD mix depends on local rails.

Evidence. EAP (Fig.13) income pie: Upper-middle $\approx 54\%$, Lower-middle $\approx 33\%$, Low $\approx 3\%$; Paid-online $\approx 17\%$, COD $\approx 33\%$. ECA (Fig.14): Upper-middle $\approx 34\%$, Lower-middle $\approx 37\%$; Paid-online $\approx 21\%$, COD $\approx 17\%$. MENA (Fig.15): Lower-middle $\approx 25\%$, Upper-middle $\approx 18\%$; Paid-online $\approx 13\%$, COD $\approx 12\%$ (roughly balanced).

Implication. Business playbooks should follow the rails: fix delivery/refunds in EAP and parts of MENA; scale frictionless online recurring payments in ECA.

5. Conclusion

About the aim. At the beginning, we asked how region and income level shape financial inclusion and whether digital finance helps to close these gaps.

Answer in brief. Both region and income still matter a lot. Digital finance helps, but not everywhere and not equally. Where mobile rails are strong, the gap narrows. Where systems are bank-centric and acceptance is low, progress is slower.

What the 2024 snapshot says. The headline KPIs for 2024 are Account Ownership 70%, Inactive 9%, and MobileAccount 34% (Fig. 4). This improves on the full-dataset overview (Account 61%, Inactive 8%, Mobile 28%; Fig. 1). By region, Sub-Saharan Africa leads on mobile accounts, while MENA sits at the low end; East Asia & Pacific and Europe & Central Asia are in the middle (Fig. 5). Income also correlates with use: higher income groups show higher digital use (Fig. 8).

What the timeline adds. The MobileAccount series rises from 2014 to 2024, with a small dip in 2022 and a rebound in 2024 (Fig. 3). Years are non-continuous in the source, so we report direction and turning points rather than exact growth rates. The 2022 dip coincides with the pandemic period, but we do not claim causality.

Usage still lags in key moments. In several countries, people still turn first to family and friends for emergency funds (≈ 0.44 – 0.73 across the listed cases; Fig. 6). In everyday payments, COD remains material ($\approx 33\%$) and can exceed paid online in some regions ($\approx 17\%$) (Figs. 7, 13–15). For government transfers with pensions, banks dominate at the global level (0.17 vs mobile 0.01 ; Fig. 10), yet East Asia & Pacific shows a real mobile foothold (≈ 0.18 ; Fig. 13). These patterns tell us that access alone is not enough; channel design and trust matter.

So-what for policy and business.

- Go with the rails. In SSA and parts of EAP, scale wallet rails (QR, agent cash-in/out, P2B, G2P).
- Activate accounts. In bank-centric regions like ECA, focus on usage (direct deposit, bill-pay, subscriptions, open-banking UX) rather than accounts only.

- Digitise safety nets. Offer bank→wallet options where wallets are strong (EAP), keeping bank primary where reconciliation is critical.
- Shift COD by fixing frictions. Improve refunds, delivery reliability, and dispute handling; account opening alone will not move COD users.

What we solved and how. The dashboard answers the research aim: it shows where and how region and income drive differences, and when digital finance reduces them. To manage data gaps, we used 2024 as the common baseline for cross-section analysis and kept trends only where years exist. Slicers (Year, Region, Income) recompute all visuals for transparent checks.

Limits and reproducibility. We used only the LMS-supplied Global Findex dataset. Some indicators have non-continuous years by design. Visuals aggregate by Average and some pies/donuts are not population-weighted. Results are descriptive, not causal. Figures and captions record the exact slicer states so the analysis can be reproduced.

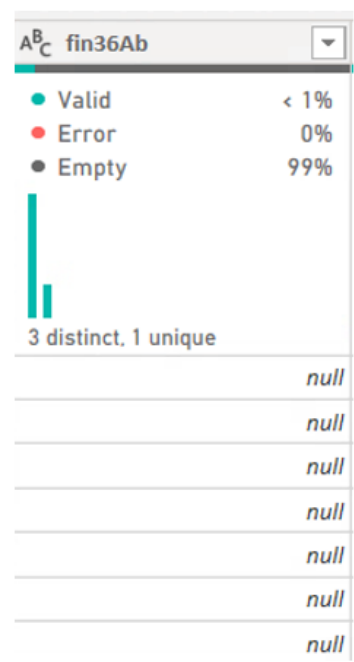
Final take. Digital finance is a practical equaliser—but only when the rails and product experience are ready. With targeted activation and better last-mile design, the gains we see in 2024 can translate into real, resilient usage across regions and income groups.

References

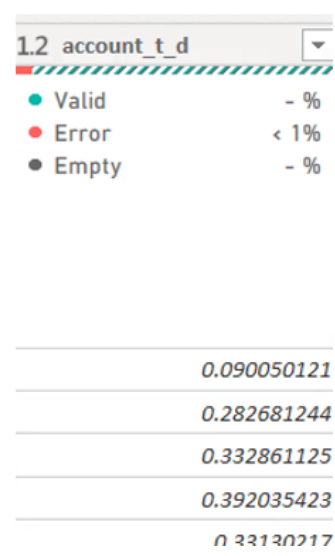
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<https://sdgs.un.org/2030agenda>
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<https://doi.org/10.1596/978-1-4648-1897-4>

Appendix A – Data Preparation screenshots

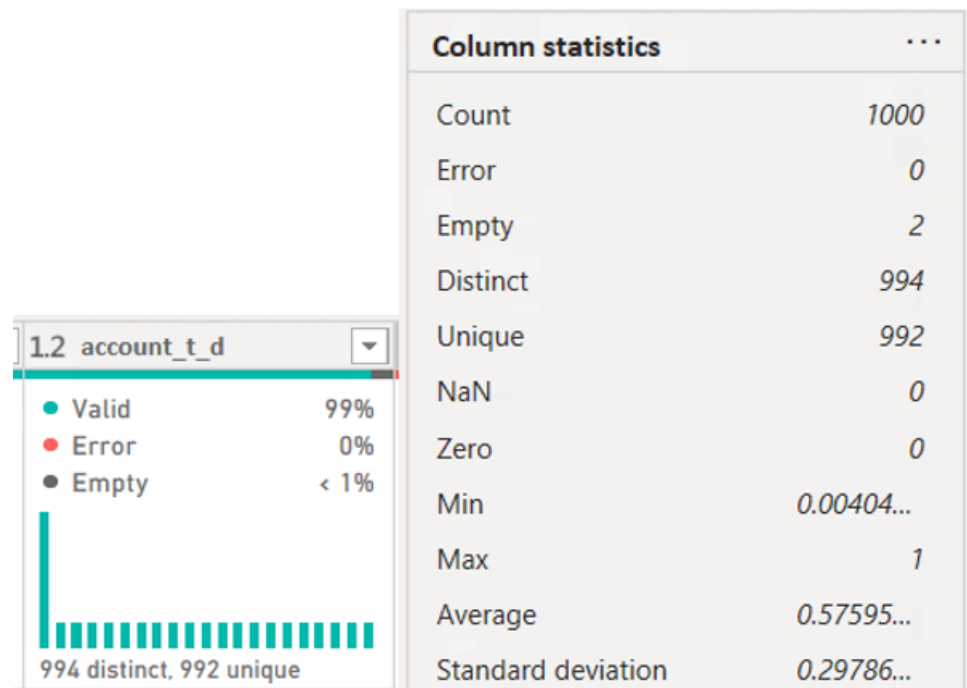
This appendix documents the data preparation workflow with Power Query screenshots. It includes checks for high-null fields, type conversion and post-cleaning statistics, region label normalisation, the applied-steps pipeline, and a final validity snapshot. Each image corresponds to the steps described in §3.2.



Appendix A Fig.1 High-Null Field Check (fin36Ab)



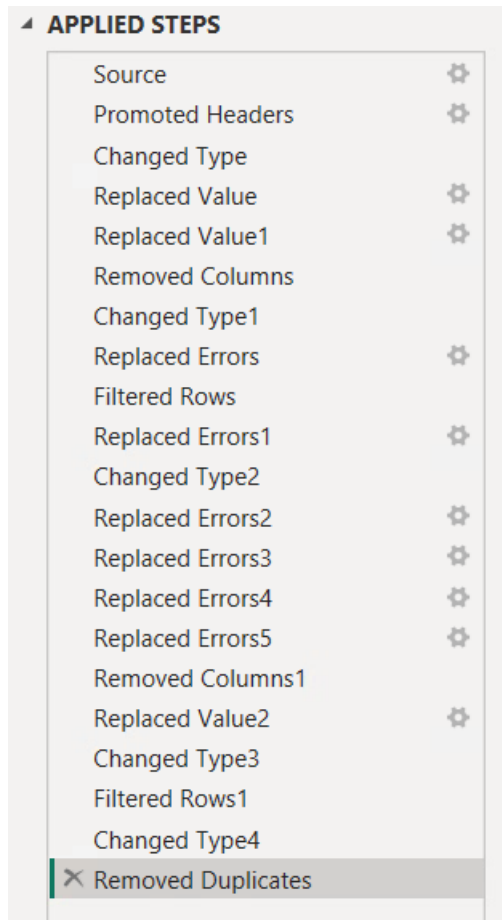
Appendix A Fig.2 Type Conversion Check — account_t_d



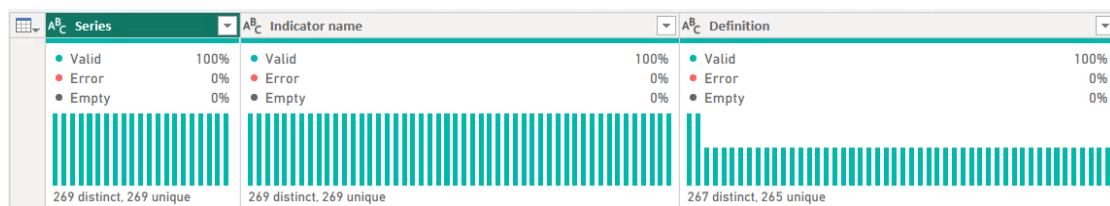
Appendix A Fig.3 Post-Cleaning Stats — account_t_d (0–1 Range)

Before	After
South Asia (excluding high income)	South Asia
Europe & Central Asia (excluding high income)	Europe & Central Asia
Middle East & North Africa (excluding high income)	Middle East & North Africa

Appendix A Fig.4 Region Label Normalisation (Suffix Removal)



Appendix A Fig.5 Applied Steps Pipeline (Power Query)



Appendix A Fig.6 Final Validity Snapshot (Series/Indicator/Definition)

Appendix B – Data Dictionary Summary

(Based on GlobalFindex2025-glossary.xlsx)

This data dictionary summarises the key variables used in the analysis of the **Global Findex Database 2025**.

It provides each variable's name, definition, data type, and example value to ensure clarity, transparency, and reproducibility of the analysis.

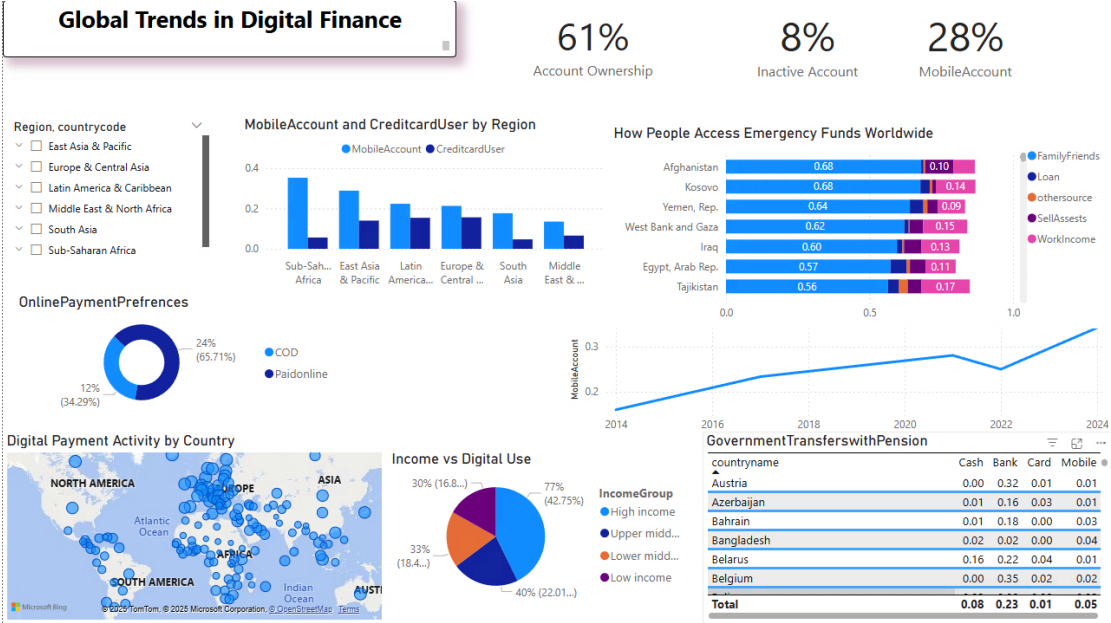
All variables were validated and standardised using Power BI during the data-cleaning process.

Column Name	Description	Data Type	Example Value
countrynewwb	Country name	Text	Australia
codewb	ISO country code	Text	AUS
year	Year of observation	Whole Number	2021
regionwb24_hi	World Bank region (high-income excluded)	Text	East Asia & Pacific
incomegroupwb24	Income classification by World Bank	Text	High income
account_t_d	Adults (15+) with any financial account (%)	Decimal Number	0.72
fiaccount_t_d	Adults (15+) with a bank or financial institution account (%)	Decimal Number	0.68
mobileaccount_t_d	Adults (15+) with a mobile money account (%)	Decimal Number	0.18
borrow_any_t_d	Adults (15+) who borrowed in the	Decimal Number	0.34

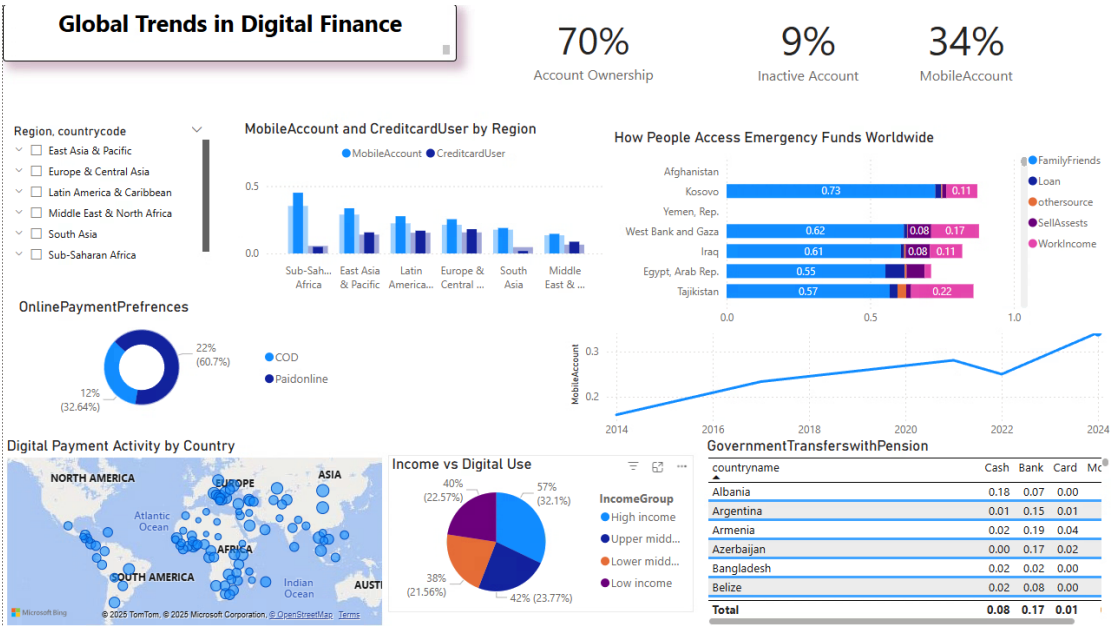
	past year (%)		
saved_any_t_d	Adults (15+) who saved in the past year (%)	Decimal Number	0.45
dig_acc	Digital account usage indicator (%)	Decimal Number	0.52
pop_adult	Adult population aged 15 and older	Whole Number	18500000

Appendix B Tab.1

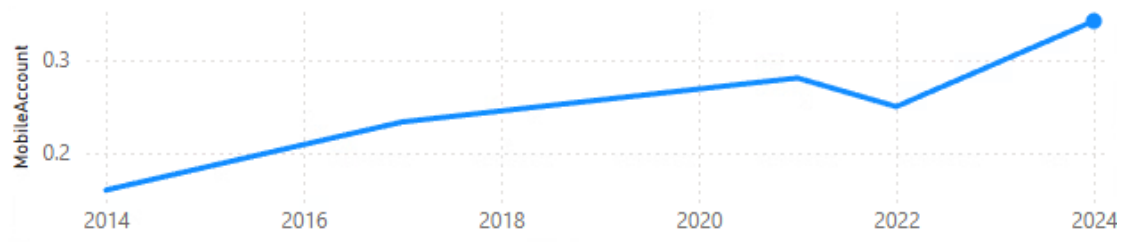
Appendix C - Figures and Dashboard Visualisations



Appendix C Fig.1 Full-dataset dashboard, 2011–2024.



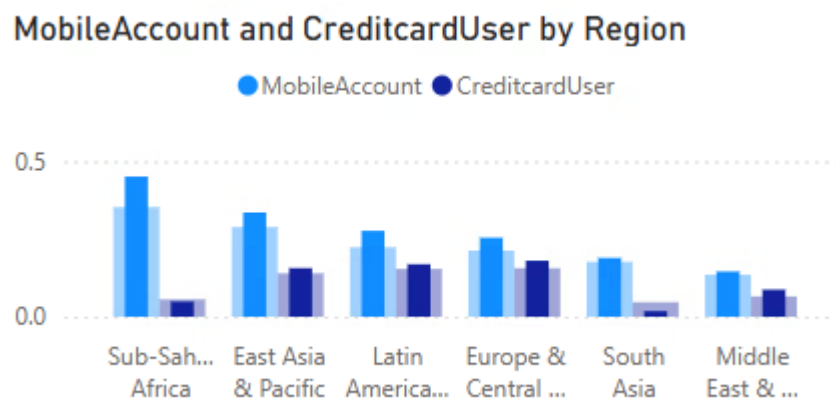
Appendix C Fig. 2 Dashboard view, Year = 2024 (interactive).



Appendix C Fig.3 MobileAccount trend, 2014–2024 (non-continuous years).

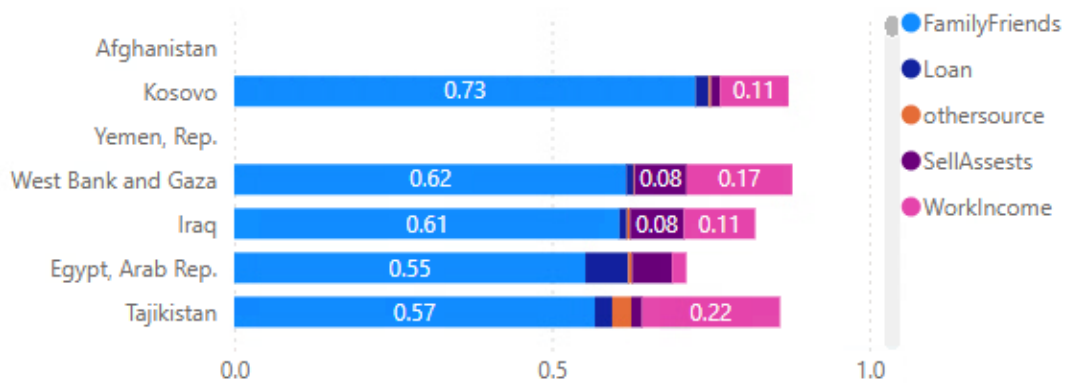


Appendix C Fig.4 KPI cards, 2024: Account 70%; Inactive 9%; Mobile 34%.



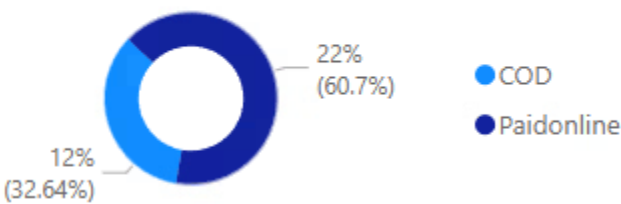
Appendix C Fig.5 MobileAccount vs CreditcardUser by region, 2024.

How People Access Emergency Funds Worldwide



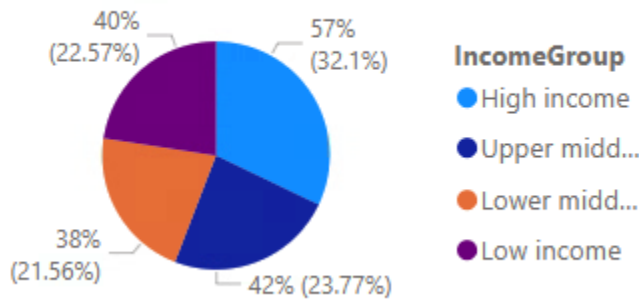
Appendix C Fig.6 How people access emergency funds (selected countries), 2024.

Online Payment Preferences



Appendix C Fig.7 Online payment preferences (COD vs Paid online), 2024.

Income vs Digital Use



Appendix C Fig. 8 Digital use by income group, 2024.

Digital Payment Activity by Country

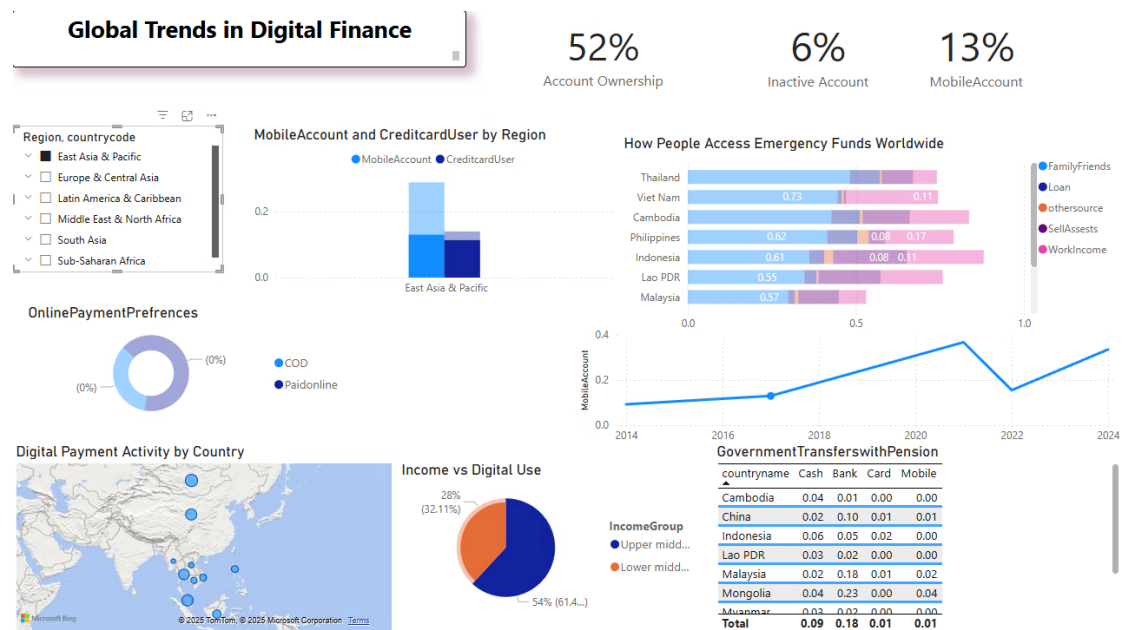


Appendix C Fig.9 Digital payment activity map, 2024 (interactive).

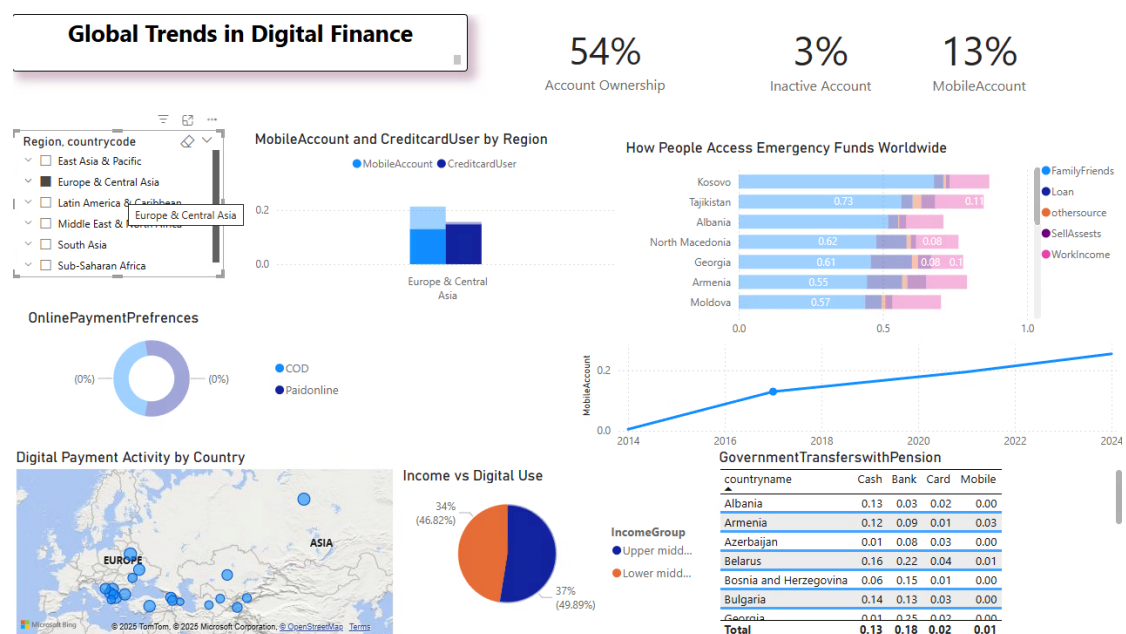
Government Transfers with Pension

countryname	Cash	Bank	Card	Mo
Benin	0.01	0.01	0.00	
Bolivia	0.04	0.02	0.00	
Bosnia and Herzegovina	0.03	0.16	0.00	
Botswana	0.04	0.04	0.00	
Brazil	0.02	0.18	0.01	
Bulgaria	0.09	0.28	0.01	
Total	0.08	0.17	0.01	

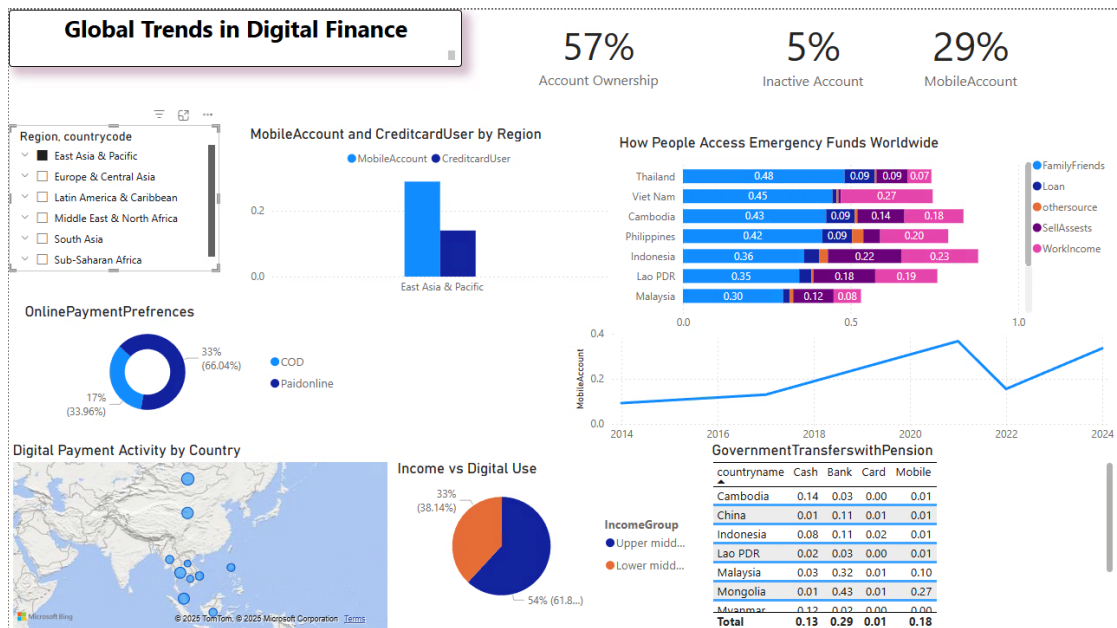
Appendix C Fig.10 Government transfers with pensions by channel, 2024
(Totals: Cash 0.08; Bank 0.17; Card 0.01; Mobile 0.01).



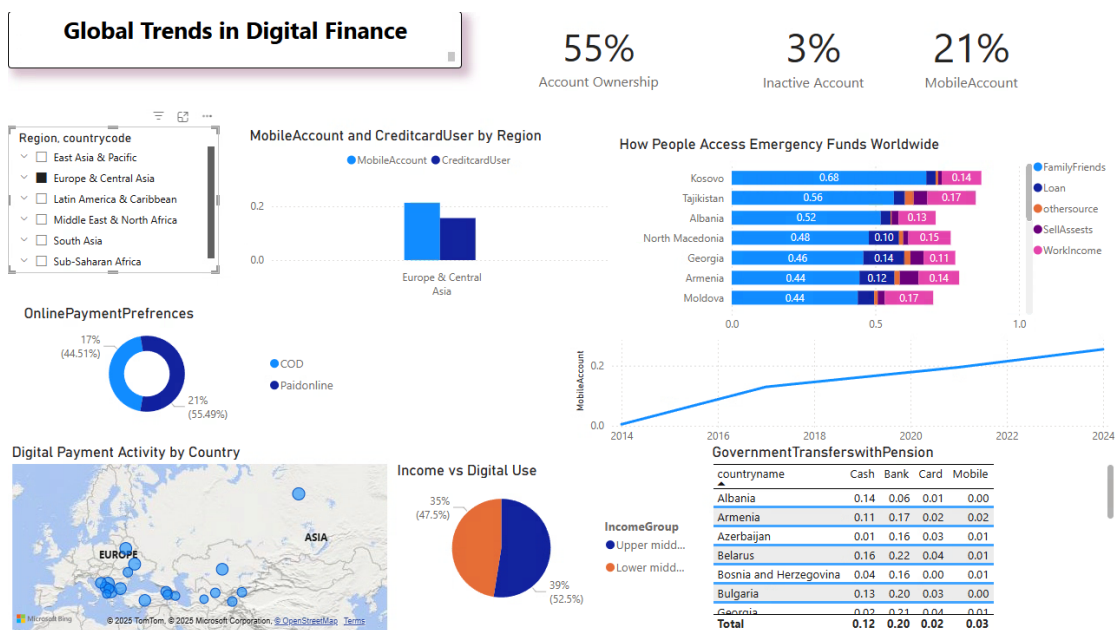
Appendix C Fig.11 2017 — East Asia & Pacific (regional cut).



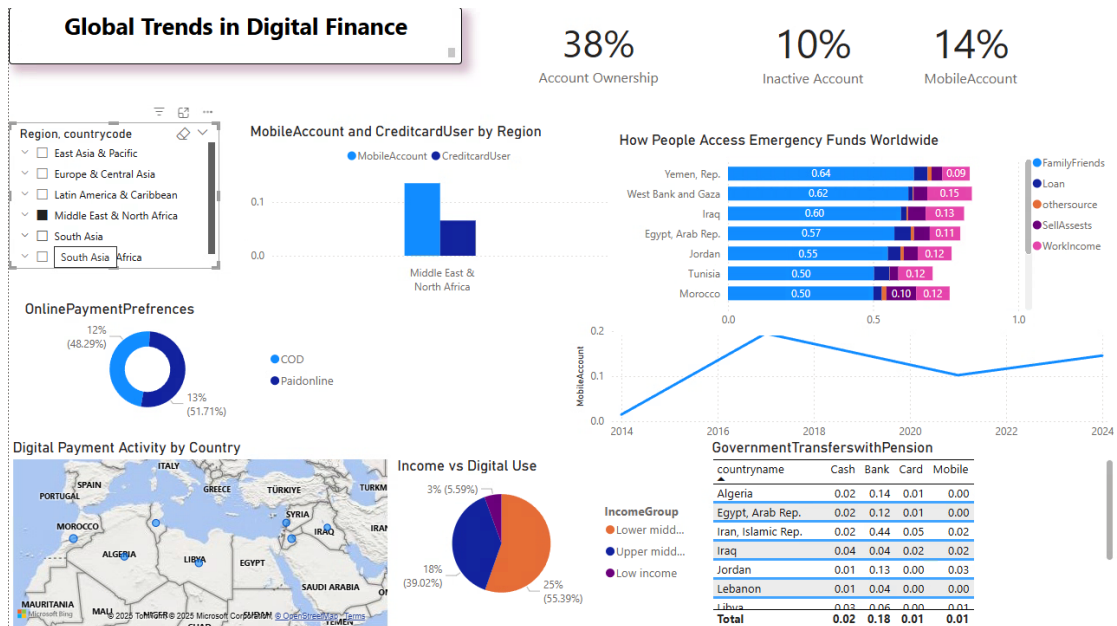
Appendix C Fig.12 2017 — Europe & Central Asia (regional cut).



Appendix C Fig.13 2011–2024 — East Asia & Pacific (2024 KPIs: Account 57%; Inactive 5%; Mobile 29%).



Appendix C Fig. 14, 2011–2024 — Europe & Central Asia (2024 KPIs: Account 55%; Inactive 3%; Mobile 21%).



Appendix C Fig. 15, 2011–2024 — Middle East & North Africa (2024 KPIs: Account 38%; Inactive 10%; Mobile 14%).