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# BIG IDEAS 2022

January 25, 2022

**Annual Research Report | For Informational Purposes Only**

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## Risks of Investing in Innovation

Please note: Companies that ARK believes are capitalizing on disruptive innovation and developing technologies to displace older technologies or create new markets may not in fact do so. ARK aims to educate investors and seeks to size the potential investment opportunity, noting that risks and uncertainties may impact our projections and research models. Investors should use the content presented for informational purposes only, and be aware of market risk, disruptive innovation risk, regulatory risk, and risks related to certain innovation areas.

Please read risk disclosure carefully.



→ **Aim for a cross-sector understanding of technology and combine top-down and bottom-up research.**

→ **Aim to understand the regulatory, market, sector, and company risks. (See Risk and Disclosure Page)**



# Big Ideas 2022: Change & Convergence

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## When has investing not been about the future?

Change appears to happen slowly and then all at once. Over time, innovation should displace industry incumbents, increase efficiencies, and gain majority market share. With the right understanding of disruptive innovation and a long-term time horizon, we believe investors will capture exponential growth opportunities, which deserve a strategic allocation in their portfolios. For this reason, ARK focuses on opportunities likely to scale as technologies converge, transforming entire industries.

To enlighten investors on the impact of breakthrough technologies we began publishing Big Ideas in 2017. This annual research report seeks to highlight our most provocative research conclusions for the coming year. We hope you enjoy our Big Ideas for 2022.







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# Technologies Are Converging

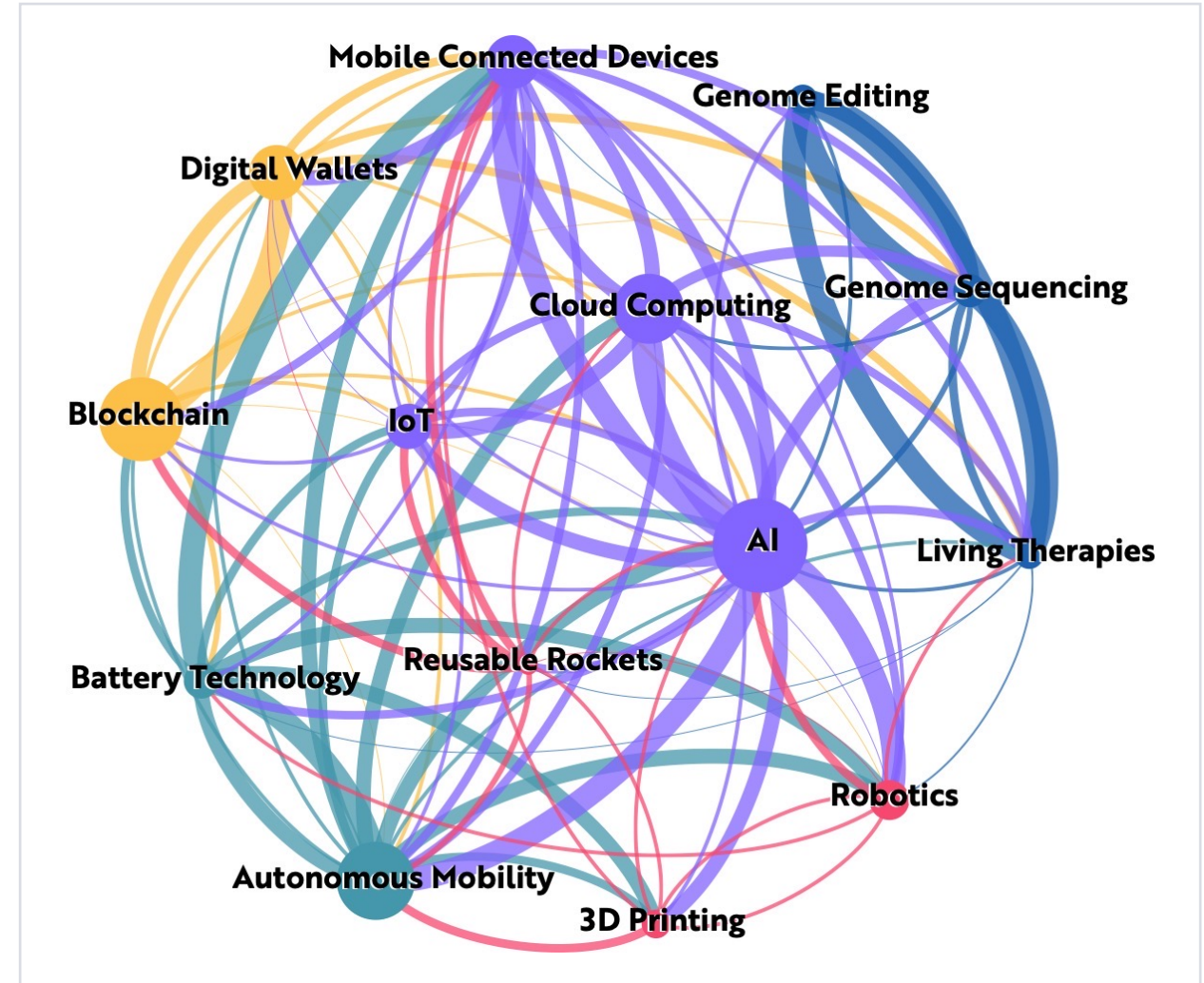
Brett Winton, Director of Research

ARK's research is centered around the belief that five innovation platforms are evolving and converging at the same time: **Artificial Intelligence, Robotics, Energy Storage, DNA Sequencing, and Blockchain Technology.**

We identified 14 transformative technologies that are approaching tipping points as costs drop, unleashing demand across sectors and geographies and spawning more innovation.

We believe that historians will look back on this era as one of unprecedented technological foment—and they will say: everything changed.

Node Size: Log Prospective 2030 Market  
Edge Size: ARK Convergence Score  
Color: Innovation Platform



Forecasts are inherently limited and cannot be relied upon. | For informational purposes only and should not be considered investment advice, or a recommendation to buy, sell or hold any particular security/cryptocurrency. ARK Investment Management LLC, 2021. Forecast is compilation of forecasts for the 14 technologies that ARK defines as underlying the 5 innovation platforms. Assumes that traditional equity market exposures continue to compound value at a rate in excess of inflation and are not substantially disrupted or marked down by negative exposure to innovation. Cryptoassets are likely to be increasingly considered a different asset class by many; comparisons between cryptoasset values and equity market capitalization are cross-asset comparisons. Numbers rounded. Source: World Federation of Exchanges, ARK Investment Management LLC, 2021.

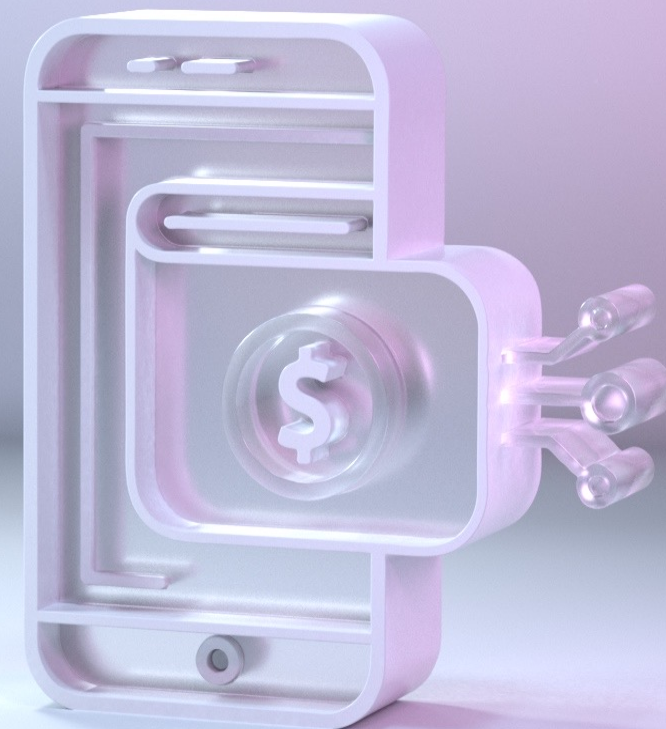
# Digital Wallets

## Upending Traditional Banking

Research by Max Friedrich, ARK Analyst, and Nishita Jain, ARK Research Associate

**Today, digital wallets like Venmo, Cash App, and others around the globe are penetrating traditional financial services, including brokerage and lending, thanks to what we believe are superior user experiences and much lower costs of acquisition.**

**In ARK's view, digital wallets could scale at an annual rate of 69% in the US, from more than \$400 billion in market capitalization to \$5.7 trillion, and 78% globally, from \$1.1 to \$20 trillion, during the next five years.**

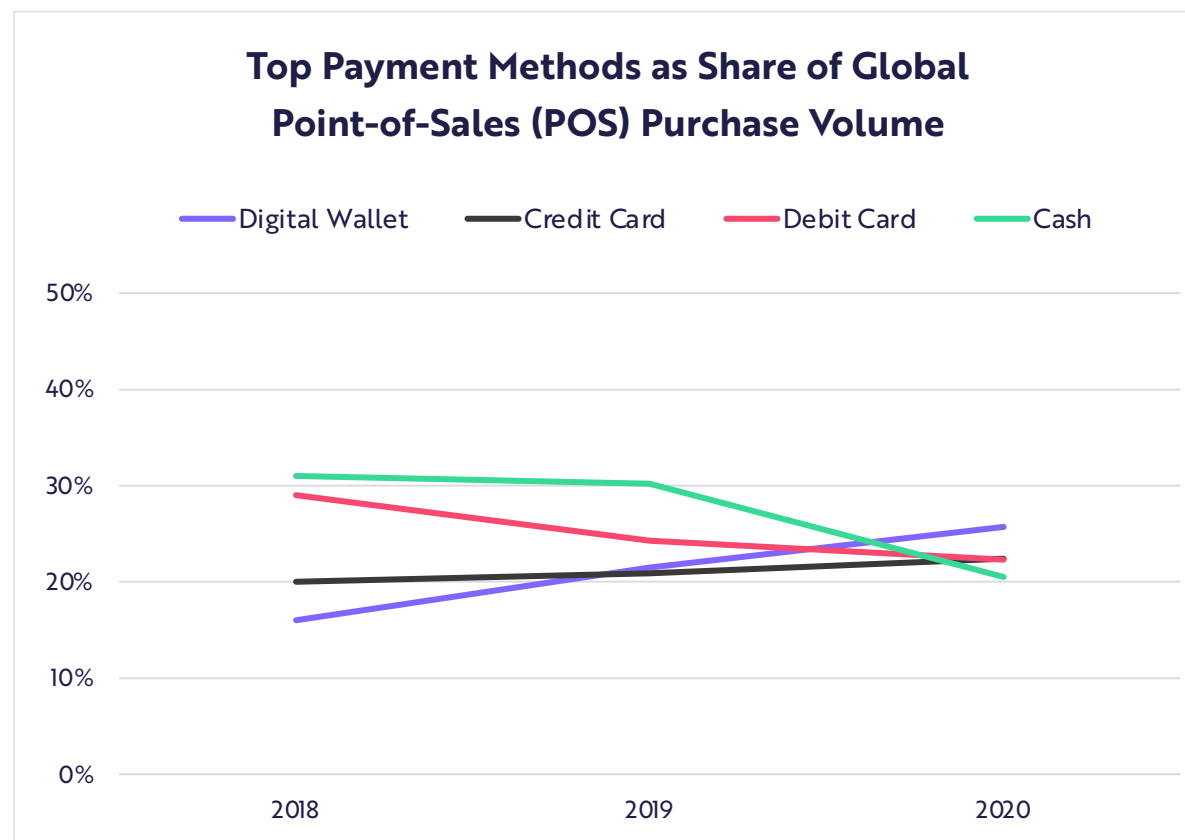
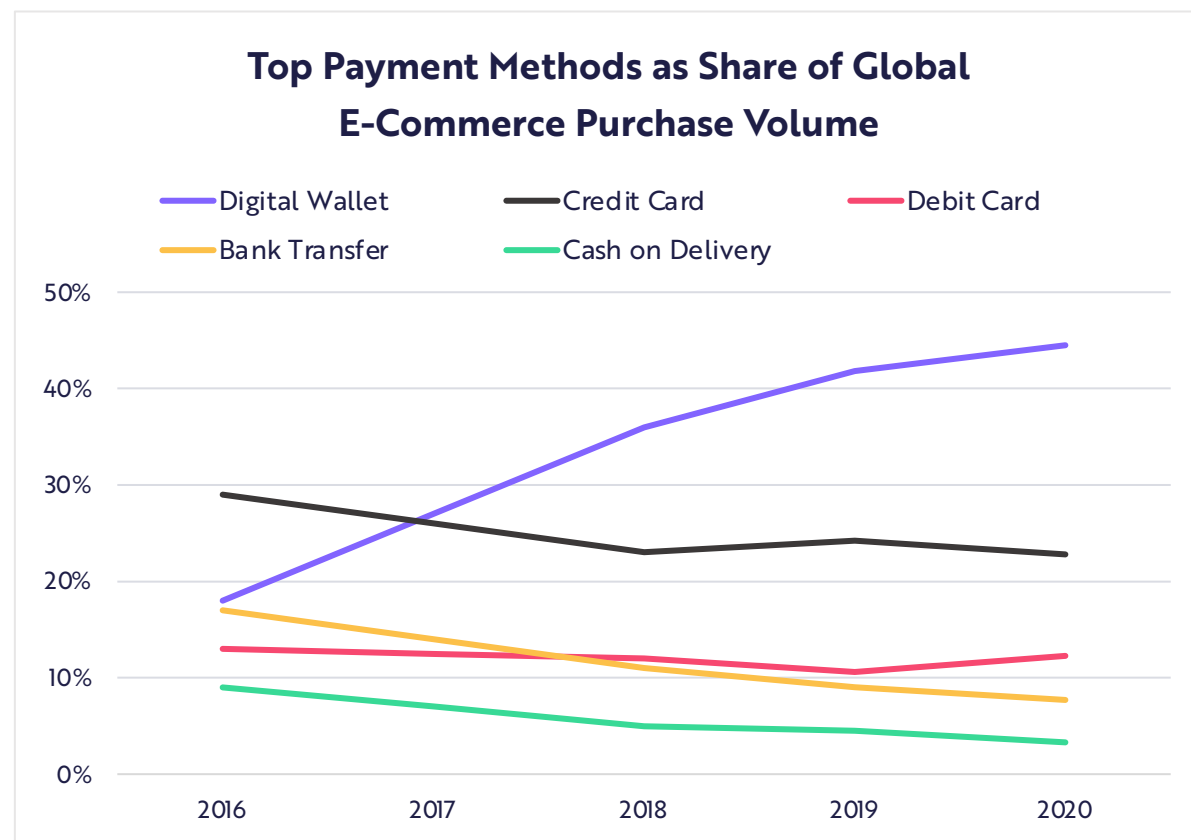






# Digital Wallets Are The Number One Payment Method Offline And Online

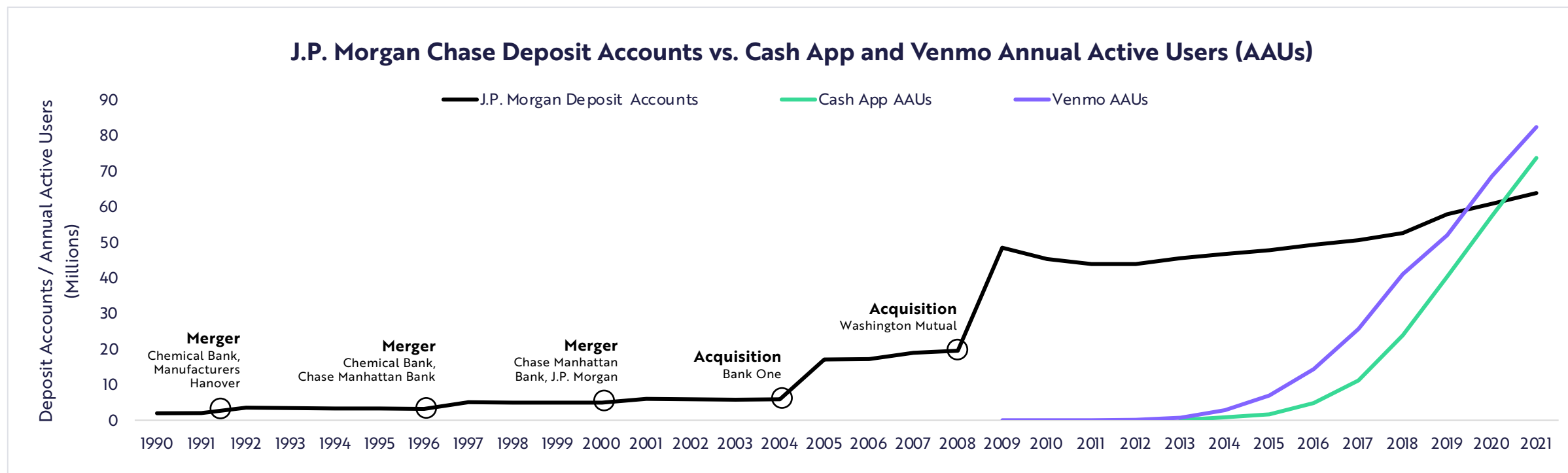
Dominating e-commerce payments since 2017, digital wallets surpassed cash last year in point-of-sales (POS) payments, likely in response to the COVID-19 pandemic.





# The Number Of Digital Wallet Users Has Surpassed The Number Of Deposit Account Holders At One Of The Largest US Banks

Based on publicly available data, Square's Cash App and PayPal's Venmo have amassed 74 million and 82 million annual active users in the past 8 and 11 years, respectively. J.P. Morgan hit 60 million deposit account holders after five acquisitions in more than 30 years.<sup>1</sup>



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[1] Refers to number of J.P. Morgan Chase deposit accounts <\$100,000 prior to 2010 and number of deposit accounts <\$250,000 after 2010 due to changing reporting regulation.

Source: ARK Investment Management LLC, 2021, based on data sourced from: Federal Deposit Insurance Corporation (FDIC) Statistics on Depository Institutions (SDI) and RIS.





# Digital Wallets Are Differentiated By Customer Acquisition Strategies

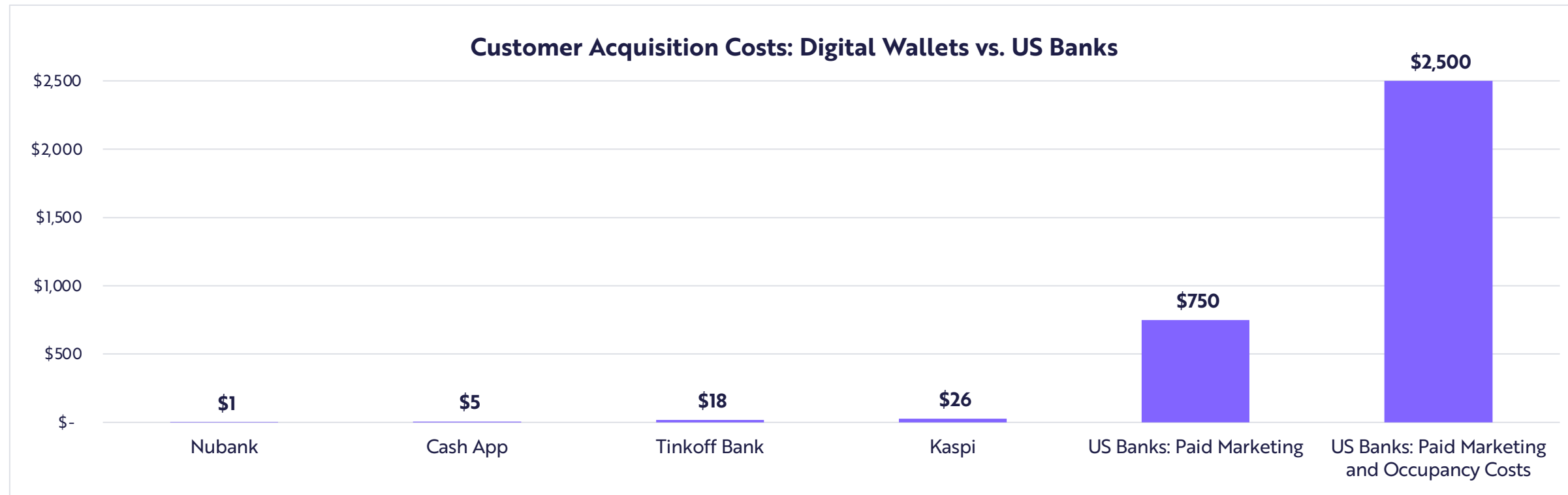
Customer Acquisition	Peer-to-Peer (P2P)	Land and Expand	Vertical Integration into Financial Services	Merchant-First
Market Structure	Developed or developing markets suffering from friction in P2P or cross-border payments	Developed or developing markets with opportunities to optimize a single use case in financial services	Developing markets with low financial services penetration	Mostly developed markets with well-established financial services, making (P2P) payments an unattractive customer acquisition strategy
Strategy	Growing P2P networks organically, sometimes accelerated by partnerships with brands or influencers	Leveraging trust with customers to cross-sell other products	Expanding into financial services, often with giveaways or rewards	Using relationships with established merchants to acquire retail customers, mostly through cash-back campaigns
Examples	   	   	   	 



# Differentiated Customer Acquisition Strategies Result In Lower Customer Acquisition Costs

On a net basis, traditional banks in the US spend roughly \$750 in paid marketing and roughly \$2500 in total, including the occupancy expenses for branch networks, to acquire a new customer

Based on network effects, viral marketing, and arguably superior value propositions, digital wallet providers spend as little as \$1 to acquire new customers, giving them room to invest and move up-market.





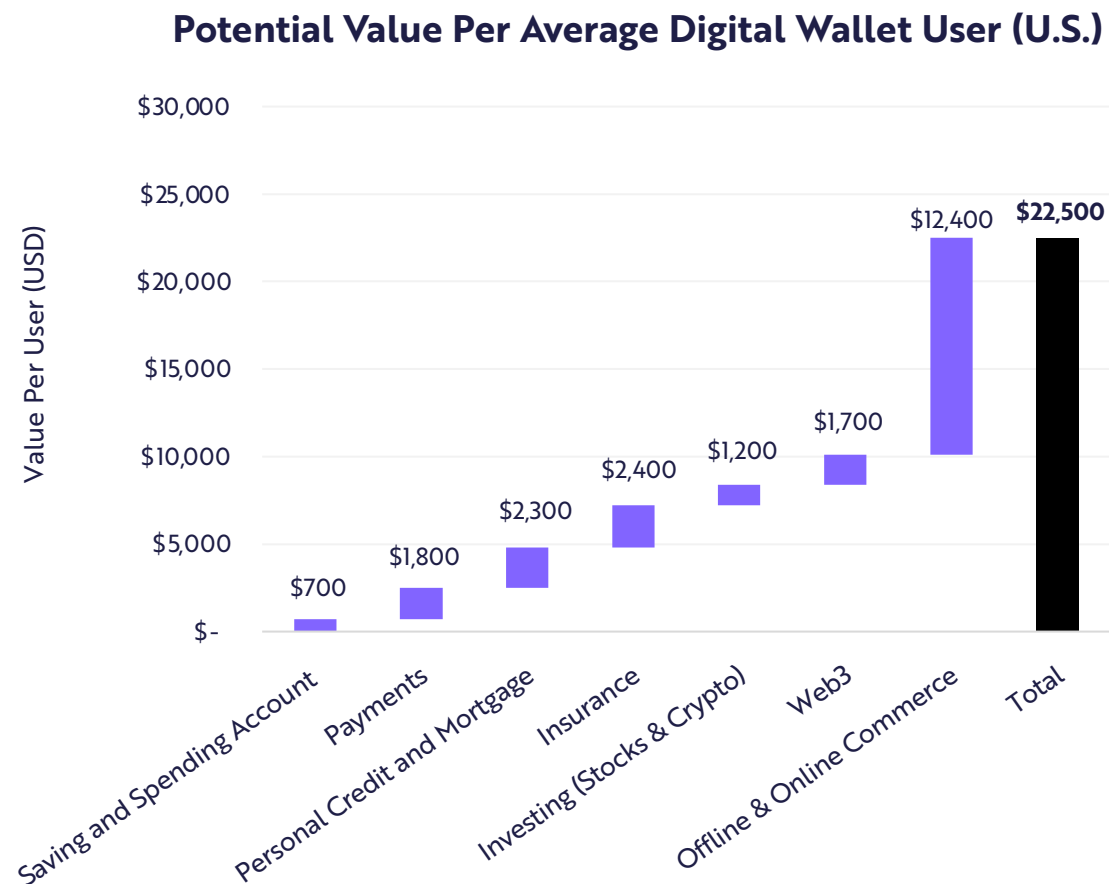


## Each Digital Wallet User In The US Could Be Worth \$22,500 At Maturity

If digital wallets were to become consumer financial dashboards, ARK estimates that the net present value of their financial service revenues would be roughly \$10,000 per average US user.

Beyond financial services, digital wallets could become lead-generation platforms for offline and online commerce, potentially adding more than \$12,000 to their net present value per user.


Digital wallets also could serve as on-ramps to Web3 assets, such as NFTs. ARK estimates that such Web3 monetization could add \$1,700 to their net present value per user.



Forecasts are inherently limited and cannot be relied upon. | For informational purposes only and should not be considered investment advice, or a recommendation to buy, sell or hold any particular security. Source: ARK Investment Management LLC, 2021. All net present value estimates based on 2020 or 2021, except web3. Offline/Online Commerce assumes digital wallet captures lead generation fee for 100% of offline and online average US consumer retail spend. Insurance assumes digital wallet captures lead generation fee on average insurance revenue per US consumer. Saving and Spending Account assumes digital wallet captures spread between interest rate and risk-free rate for average balance of US transaction accounts as defined by the Federal Reserve or lead generation fee on net interest income. Offline and Online Payments assumes digital wallet captures fee on 100% of offline and online average US consumer retail spend. Personal credit and mortgage assumes digital wallet captures spread between interest rate and risk-free rate for interest income from average debt per adult in US or or lead-generation fee on net interest income. Investing assumes digital wallet captures revenue (excluding commissions) from average US brokerage and cryptocurrency exchange consumer. Web3 assumes digital wallet captures lead-generation or first party marketplace fee on 100% of 2026 web3 Gross Merchandise Value as forecasted by ARK.



# The US Digital Wallet Opportunity Could Scale 69% At An Annual Rate From More Than \$400 Billion In 2021 To \$5.7 Trillion In 2026.

Digital Wallet Penetration of Smartphone Users 2026 (US)	Digital Wallet Users 2026 (US)	Potential Value per Digital Wallet User (US)	Penetration of Potential Value per Digital Wallet User					
			5%	10%	25%	50%	75%	100%
			Digital Wallet Opportunity (US)					
50%	127 Million	 \$22,500	\$140 Billion	\$290 Billion	\$710 Billion	\$1.4 Trillion	\$2.1 Trillion	\$2.8 Trillion
75%	190 Million		\$210 Billion	\$420 Billion	\$1 Trillion	\$2.1 Trillion	\$3.2 Trillion	\$4.2 Trillion
100%	250 Million		\$290 Billion	\$570 Billion	\$1.4 Trillion	\$2.8 Trillion	\$4.2 Trillion	\$5.7 Trillion

If every US smartphone user, valued at \$22,500 per user, would adopt a digital wallet by 2026.





# The Global Digital Wallet Opportunity Could Scale 78% At An Annual Rate From \$1.1 Trillion To \$20 Trillion In 2026.

