

FinTech & Iris Recognition Technology
Impact & Opportunities During Covid-19
May 2020

Preamble

In mid-January 2020, the world suddenly came to a halt. The emergence of Covid-19, which was sudden and unexpected, shook the global economies to the core and the impact of the pandemic has proven beyond catastrophic.

Some early estimates from the IMF set the costs to global economies at \$9t over the next 2 years. Global economies are expected to contract in average 3% over 2020. Individual regional growths were also slashed, particularly for Asia to 2.2% from 5.5% estimated in September last year. China's forecast was slashed to 2.3%, over half from the estimated 6% last year.

Some industries have been and will remain highly affected by Covid-19 for years to come. Those include amongst others, transport, tourism and entertainment. Others have been less impacted and could even reap opportunities during these dire times. Those are sectors that have emerged as essential for either human safety or survival. They include for instance, healthcare services and pharmaceuticals.

As far as the performance of Biometrics and FinTech sectors' is concerned, the pre-Covid-19 era witnessed a boost fueled by an increase in e-payment's demand from digital consumers, the growing needs for financial services from the non-banked populations, along with the rise of personal data relating to issues of security and fraud prevention. As a result, these sectors were already showing considerable growth. Due to the current pandemic, both these sectors are prone to grow even more rapidly. The FinTech sector has emerged as an essential tool in dealing with the logistics of the Covid-19 whilst also providing a vital service to the increasing unbanked population. In that same vein, Iris Recognition Technology (IRT) is gaining prominence in the face of an increasing demand for "contactless" solutions. With people wearing masks and gloves rendering face recognition and fingerprint technology counterparts non-viable, the demands for the sector post-Covid-19 is likely to show significant opportunities for expansion both in terms of volumes and users.

Market Growth Pre-Covid-19

The global IRT market size pre-Covid-19 was expected to grow from \$2.3b in 2019 to \$4.3b by 2024. The market was expected to register a growth CAGR of 22.76% during 2020 to 2025. The high adoption of IRT by government organizations for identification purposes was the primary driving factor for the growth of the market. The increasing penetration of IRT in the consumer electronics vertical and high demand for iris scanners are a few other key factors that were positively impacting the growth of the sector.

The IRT market, by product, is segmented into smartphones, wearables, tablets & notebooks, PC/laptops, and scanners. Scanners were expected to dominate the market due to high adoption from government & semi-government/multilateral agencies, banking & finance, military &

FinTech & Iris Recognition Technology
Impact & Opportunities During Covid-19
May 2020

defense, and travel & immigration, especially for identity management and access control application.

IRT is used in many different settings and across various activities from healthcare to banking to humanitarian aid. On another level, the combination of IRT and FinTech was the fastest growing segment of the sector. The global FinTech market was worth \$128b in 2018, with a predicted annual growth rate of 25% until 2022 to \$310b.

Growth in the digital payments sector was driving the FinTech market. FinTech has made payments for goods and services faster, easier, more convenient, and cost-efficient for customers. Customers can now pay for various goods and services via cryptocurrency, loyalty points, and other digital cash alternatives. PayPal, the virtual payment platform, increased its account base by 17% over 2017, reaching 267 million active accounts, with a record 13.8 million added in the fourth quarter of 2017 alone. Another driving force was the increasing use of block chain technology for better security and operational efficiency. As highlighted in a PwC's FinTech report, by 2020, 77% of financial organizations planned to integrate block chain into their operations and 90% of payment companies planned to use block chain. Within the block chain niche, the IRT applications used for credentialing purposes have become an integral part of the system.

Across the MENA region, the biometrics market was expected to grow at a 21.25% CAGR over 2019-2027. The driving force in the region was the banking sector. Middle East banks were leading the use of IRT biometrics at ATMs to eliminate the need for cards and PINs. For instance, Qatar National Bank had begun using Iris ID at banks in three continents.

One interesting and surprising factor of FinTech adoption rates however, is geographic distribution. A study performed in February this year by Jon Frost, Senior Economist of Innovation and the Digital Economy at Bank for International Settlements, looked at the adoption rates of FinTech geographically and its findings showed insights on the future growth potential of the FinTech sector from a macroeconomic standpoint.

The study found that the adoption rates were surprisingly much higher in emerging markets and developing economies (EMDE) than in mature markets. For instance, mobile payments made up 16% of GDP in China, but less than 1% in the US in 2018. Especially in EMDE, mobile payments were benefiting from the high share of consumers with mobile phones, which often exceeded those with bank accounts or credit cards. In many African countries, but also in Chile, Bangladesh and Iran, over 20% of the population had a mobile money account according to the latest World Bank survey in 2018.

The cross-country differences in the scale of FinTech adoption were notable. Even within countries, certain cities – like Hangzhou, Seattle, and Tel Aviv – had become unexpected hotbeds of FinTech activity. Meanwhile, some traditional financial centers – like Tokyo and

FinTech & Iris Recognition Technology
Impact & Opportunities During Covid-19
May 2020

Milan – had less FinTech activity than would be expected by their position in other areas of financial services.

To explain these discrepancies in adoption rates, Frost analyzed many different economic data and concluded that aside from technological advances, the key forces driving FinTech adoption were unmet demand and changing demographics.

The results showed that FinTech was growing faster in markets containing a demographic traditionally excluded from the financial system, or in markets that need to overcome specific failures (information asymmetry, high transaction costs, etc.). For instance, around the world, approximately 1.7 billion adults lack access to a bank account. Especially in EMDEs, many households rely primarily on cash for day-to-day transactions, and this is closely linked to the large size of unregistered economic transactions (often called the informal economy). Among those with a bank account, services like credit, insurance and wealth management were not accessible at all – or not at affordable prices for clients. Even in advanced economies, certain groups lacked access to basic financial services, including ethnic and religious minorities, migrant workers, and refugees. Unmet demand for basic banking, means of payment, and money transfer services were the key factor behind the rapid growth of mobile payment offerings in countries like India, Africa and Latin America. Perhaps the most famous example is M-Pesa, the mobile money transfer system introduced by Kenya's telecom provider Safaricom in 2008. M-Pesa now operates in multiple countries across East Africa, North Africa and South Asia, and counted 32 million users in 2018.

Another example of this trend was depicted in the remittance's services. Cross-border transfers of cash were often slow and expensive, and this problem was even more acute for money sent by workers to their families in EMDEs – often in small amounts, and to geographically remote locations. The World Bank found that the average cost to send \$200 to EMDEs was 6.84%, or \$13.68, a very high cost that most blue-collar workers can ill afford. Not surprisingly, remittances (and cross-border payments more generally) are one area where FinTech providers have gained a relatively stronger foothold.

When looking at the adoption growth of IRT for fraud prevention and social benefit grants in EMDE these theories held true. For instance, in 2009 the Government of India set up the Unique Identification Authority of India and enrolled 1.25 billion Indian citizens in three years in their ID card program, recording both iris and fingerprint data of each citizen. This had an enormous impact on reducing social benefit fraud and ensuring that aid goes to those most in need. Previously more than half India's Government aid was routinely fraudulently appropriated. Following this success, countries such as Indonesia, Singapore and Mexico have followed suit with their own versions, some including iris patterns on passport data.

Following this trend of underserved markets that have witnessed significant growth for IRT and FinTech, stands the refugees' crisis. Biometrics solutions continued to be deployed by the

FinTech & Iris Recognition Technology
Impact & Opportunities During Covid-19
May 2020

United Nations to positively identify refugees worldwide and to make sure aid is distributed accurately and efficiently. It is part of a global agreement signed in 2016 between donor nations and humanitarian agencies to reduce the cost of refugee aid while making sure all who need help get it without sacrificing their privacy.

In 2019, 80% of refugees over the age of five registered by the United Nations were issued unique biometric identities, according to the world body's High Commissioner for Refugees agency. The UN estimated that there were about 26 million refugees around the world, and that more than half were children under the age of 18. In 2015, The UN created the Biometric Identity Management System (BIMS) to scan irises and fingerprints either online or offline. The system has been deployed to at least 100 food-distribution sites spread across 13 African nations and one in South Asia (Bangladesh) experiencing refugee crises. Biometrics in 2018 were used to register refugees in 69 commission operations, up from 52 in 2017 or a growth of 33% over the year.

The Impact of Covid-19

Three drivers of the Biometrics/FinTech sectors are being pushed to the fore due the Covid-19 pandemic. First, technologies have come to play a major role – as we will explain further below – in dealing with the logistics of the pandemic; second, the economic repercussions of the pandemic will be significant on the population, ultimately increasing the number of un-bankable or people requiring some type of financial assistance; and third “contactless” services/disbursements will become the new normal for years to come.

Technology has been at the forefront of the fight against the pandemic. Several companies, including Alibaba, YITU, Graphen and Google DeepMind, have developed AI tools to help detect the virus, diagnose its evolution, track its geographical footprint, project its future, and predict its potential protein structure to find a vaccine.

In particular, biometric systems have been brought into the spotlight as a key technology for early detection, patient screening and public safety monitoring, in an effort to contain the spread of Covid-19. Surveillance, border control, law enforcement, healthcare and biotechnologies are the key markets that are rapidly introducing biometrics into infectious disease prevention and control protocols.

The most immediate impact of Covid-19 is that contactless technologies like face recognition and IRT algorithms are being pushed to new heights to extend governments' protective, monitoring and screening reach. In contrast, applications that rely on fingerprint and vein recognition modalities are suffering a significant loss in market share, as they are heavily reliant on contact-only sensing technology, which, in turn, poses a great hygienic risk and severely limits infectious control protocols. In countries with a great reliance on biometric identification, like India, this limitation has already shown itself, by forcing the government to

FinTech & Iris Recognition Technology
Impact & Opportunities During Covid-19
May 2020

effectively terminate all contact-based biometric access control in certain high-risk regions. Covid-19 will have a significant impact on future biometric applications across different markets and verticals worldwide, while contact-only applications are likely to suffer in certain markets, including enterprise, healthcare and border control.

Vendors will need to rethink fingerprint and vein verification modalities as governments look to give additional emphasis to face recognition and IRT. This will create even more hurdles, because a great many biometric systems used in law enforcement are based on fingerprint identification – including police automated fingerprint identification systems, biometric identification systems, and border control, visa control and immigration apps. These limitations on contact-based recognition technologies represent a remarkable opportunity for IRT, which ironically, offers a further competitive advantage over face recognition that cannot recognize people wearing face masks, despite efforts by the likes of Facebook trying to make it work. Many biometrics systems based on fingerprints are rendered obsolete and will need to be retrofitted in order to adhere to the new “contactless” norms.

EMDE and particularly the Middle-East, have experienced a major increase in both inquiries for and sales of biometric, face recognition and IRT systems since February 2020, as contactless biometrics has witnessed an increase in exports due to the spread of Covid-19. This is the case of Union Community, a biometrics provider, which has seen orders from Egypt increased by more than 400% over the first half of the previous year as the government replaced its attendance system with face recognition terminals, the order rate in Saudi in 2020 exceeded last year's, as sales to Saudi are expected to be up by 200% in Q2 2020. Interest in IRT is expanding in countries such as Qatar to identify people wearing a hijab. Union Community expects this trend to continue in Q2 2020 and will move up the release of IRT systems previously scheduled for the second half of the year to address the increased demand.

The impact on FinTech is somewhat blurrier. Unlike traditional banking organizations, the majority of FinTech firms have been in existence less than a decade, with only few showing operational profitability. In most cases, FinTech firms have relied on investor funding which is far from guaranteed in the near or intermediate future, especially as revenues have dropped since the pandemic. In many ways, most young FinTech firms are more vulnerable than their legacy banking counterparts, despite being better positioned for the digital transformation occurring in banking. In a such relatively blurry picture, UBS just announced it has put together a fund to invest in FinTech startups, with each investment ranging between \$10 to \$20 m.

Few start-up FinTech firms have much cash on hand and even fewer have lines of credit. A March 2020 survey of more than 1,000 tech start-ups across the globe by Genome, found that more than 40% of said firms did not have enough capital to survive past June, with about two-thirds of these firms not having enough capital to survive past September.

However, for the more established FinTech firms, the accelerating customers' use of online - especially mobile - channels to view and manage their finances will have a significant impact.

FinTech & Iris Recognition Technology Impact & Opportunities During Covid-19 May 2020

Because many FinTechs are purpose-built for the mobile channel, they often excel in offering presentation, onboarding, underwriting, data visualization, and providing the right context for transactions. These capabilities will likely become even more relevant and important as a greater number of financial transactions are conducted through digital channels.

Furthermore, the economic disruption of the pandemic is highlighting the importance of serving people who are currently outside the financial system, both in developing and developed economies. Indeed, the pandemic is likely to accelerate these demographics across the globe and this category is often ignored in more developed countries. For instance, the Federal Deposit Insurance Corporation estimates that in 2018, 6.5% of US households were unbanked. Even for those who were in the banking system, 40% would have difficulty covering an unexpected expense of even \$400, and almost three-quarters of the employees in the United States would experience financial difficulty if their paychecks were delayed for a week. In the US, during the pandemic, unemployment rates rose by 4.4% in March with projections that total unemployment will reach 32% before the crisis is over. Similar figures are also estimated for most European countries including strong economies such as Germany, UK, and France.

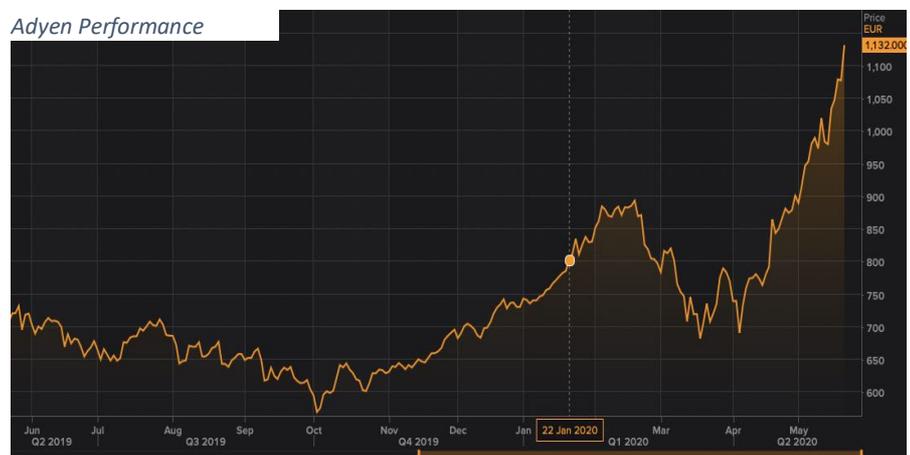
FinTechs will play an important role, perhaps through strategic partnerships across a broad ecosystem of players—including financial institutions, retailers, and the government sector—in distributing benefits to more vulnerable populations. These “e-financial” solutions are endless and can be adapted to many sectors. For instance, contactless payments can apply to services such as connected cars that allow consumers to pay for gas or food without handling cash or other potentially infected surfaces.

FinTech Sector Analysis during Covid-19

In order to gauge the real impact of Covid-19 on the FinTech and biometrics sectors, we have looked at the performance of major listed companies in each sector during this time. In the FinTech sector we have selected companies that operate mainly in the e-payment vertical.

Ayden

Ayden is a provider of mobile, online and point-of-sale (POS) payment solutions based in the Netherlands. It operates an online platform enabling merchants to accept payments internationally and from all sales channels, such as online shops, mobile payments from applications and Websites, and POS, such as countertops,



FinTech & Iris Recognition Technology Impact & Opportunities During Covid-19 May 2020

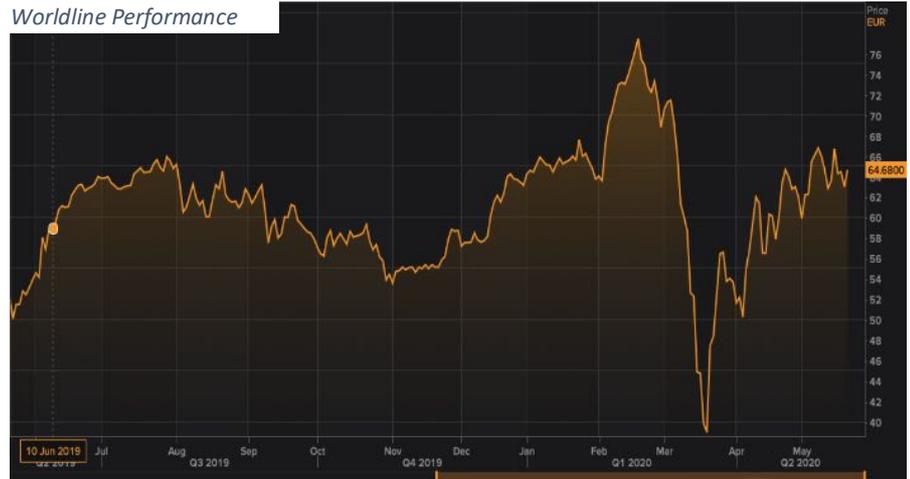
mobile terminals, tablets and cash registers, among others. The company's customers include Mango, KLM, Netflix, Superdry, Uber, Groupon and Crocs, among others.

With the increase of demand for online payment during Covid-19, Adyen saw a significant jump in its stock, that boosted it past its pre-Covid-19 results. Compared to the same time last year, Adyen's stock gained 62%.

Worldline

Worldline is a France-based company providing payment and transaction services. The company creates and operates digital platforms that handle all transactions between corporations, their partners and customers.

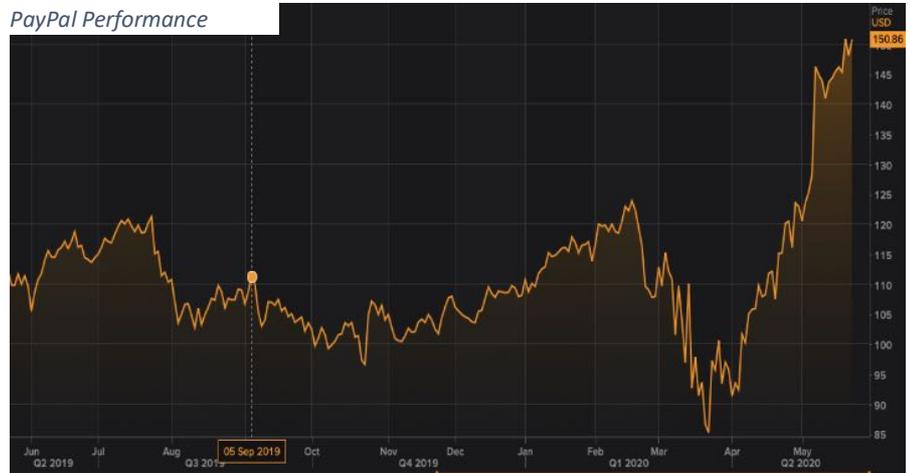
Worldline's stock gained 29% over its stock price at the same time last year.



PayPal

PayPal Holdings is one of the largest technology platform and digital payments company that enables digital and mobile payments on behalf of consumers and merchants.

PayPal is seeing a surge in demand during the pandemic. Its stock gained 43% from the same period last year.



On average, these FinTech companies had stocks 45% higher in value compared to the same time last year.

For the biometrics sector, we have selected companies (below) based on the types of biometrics provided.

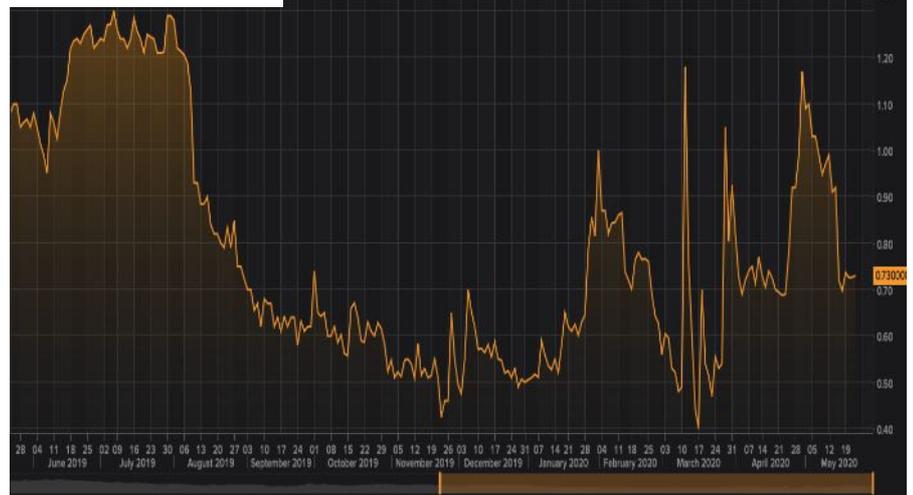
FinTech & Iris Recognition Technology Impact & Opportunities During Covid-19 May 2020

BIO-key International

BIO-key International develops and markets fingerprint biometric identification and identity verification technologies, cryptographic authentication-transaction security technologies, as well as related identity management and credentialing software solutions.

Compared to the same time last year, its stock lost 39% in value.

Bio-Key Performance

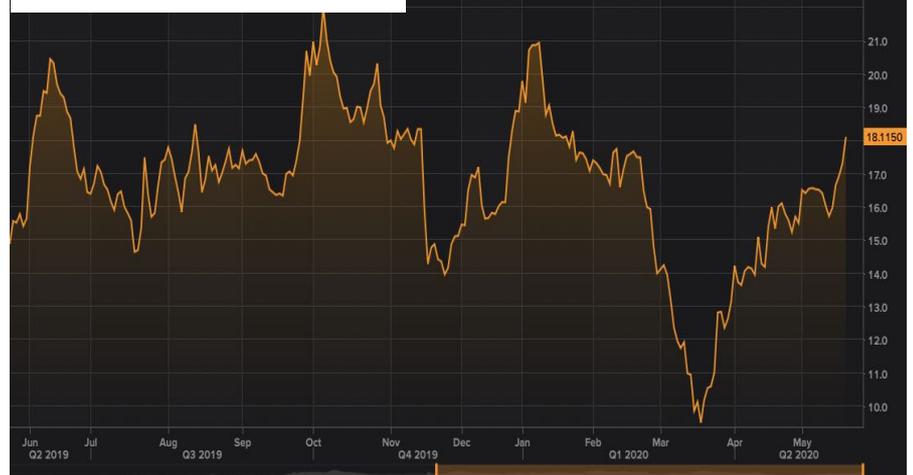


Fingerprint Cards

Fingerprint Cards is a Sweden-based technology company, which develops, produces and markets biometric technology, which, through analysis and matching of an individual's unique fingerprint, verifies the person's identity.

Compared to the same time last year Fingerprints Cards lost 10% of its stock value.

Fingerprint Cards Performance



Next Biometrics Group

Next Biometrics Group is a Norway-based company active in the field of technology. It manufactures fingerprint sensors for the companies engaged in the technology industry.

Compared to the same time last year, Next Biometrics lost 59% of its stock value.

Next Biometrics Performance



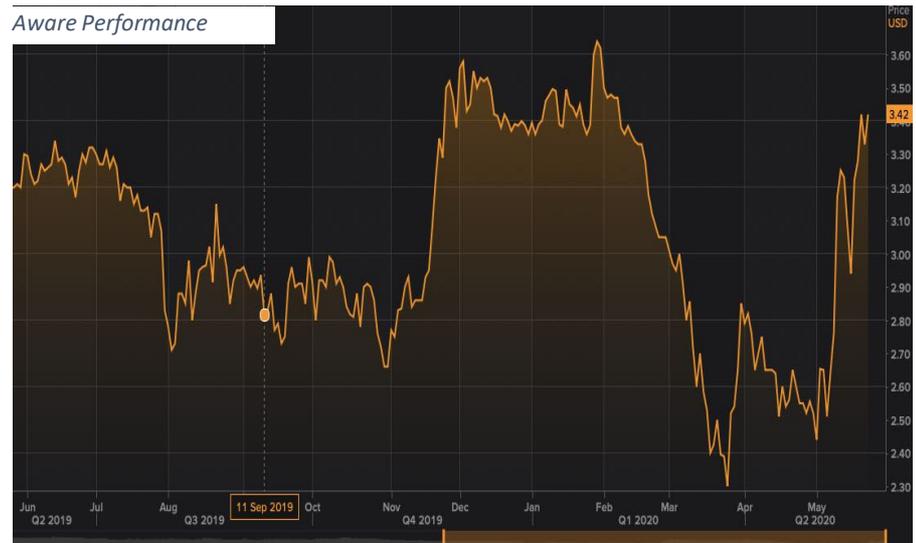
FinTech & Iris Recognition Technology Impact & Opportunities During Covid-19 May 2020

On Average, the Biometrics companies specialized in contact-based recognition technology lost 36% of their stock values compared to the same time last year.

Looking at more diverse Biometrics providers, who encompass other forms of biometrics including IRT and face recognition, the results are different.

Aware, Inc.

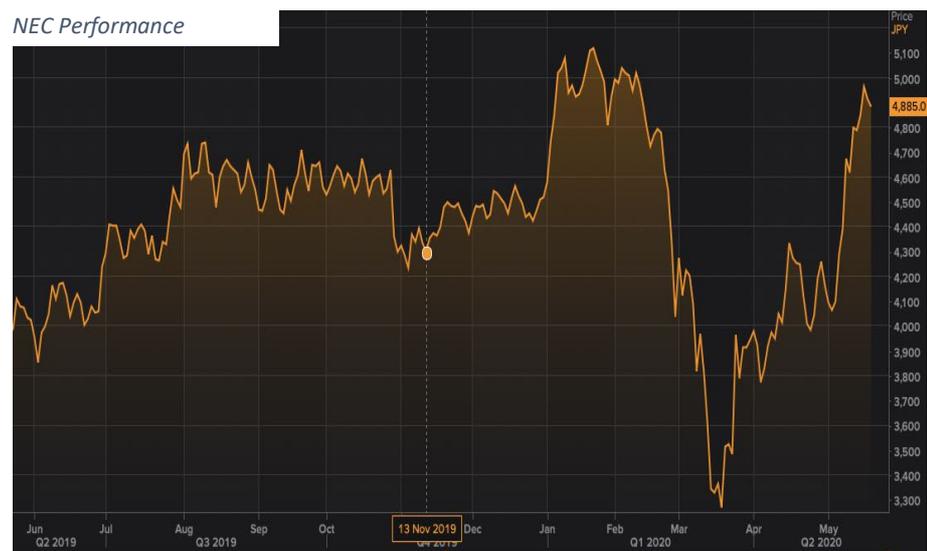
Aware, Inc. is a provider of software and services to the biometrics industry. The company's software products are used in government and commercial biometrics systems to identify or authenticate people. Its products provide biometric functionality and are used to capture, verify, format, compress and decompress biometric images, as well as aggregate, analyze, process, match and transport those images within biometric systems. They offer all form of Biometrics solutions.



Compared to the same time last year, Aware's stock gained 8.5%.

NEC Corporation

NEC Corporation has over half-century of biometric technology expertise. It couples recognition with real-time identification, verification and situation analysis for quick decision-making, preemptive security, and smoother services. It has installed in over 1,000 major systems in more than 70 countries and regions worldwide. NEC also provides fingerprints recognition, but their expertise resides in face recognition and IRT.



Compared to the same time last year, NEC stock gained 25%.

FinTech & Iris Recognition Technology
Impact & Opportunities During Covid-19
May 2020

The financial performances of the companies above support the findings in this paper: well-funded FinTech companies are being propelled to the foreground especially when it comes to payment systems; and biometrics companies, specialized in contactless systems are performing at much higher levels than their fingerprint counterparts.

So, companies that have already expanded their offering platforms could be poised for tremendous growth. For instance, IrisGuard (privately-held and fairly funded) has developed several IRT-based applications in the fields of border control, banking (the first iris-enabled ATMs), consumers' activities (the first iris-enabled supermarket POS); on top of being the first to secure blockchain authentication by replacing the cryptic key with an iris.

Furthermore, IrisGuard operates in all the verticals set to post high growth post-Covid-19. These sectors include national aid, cash payment, banking, national security, humanitarian and cash & food distributions and remittances. IrisGuard has award-winning technologies that cover the last mile blockchain authentication using a verified iris, a seamless end-to-end IRT EyeCloud solution that could be integrated into any payment system including digital currencies and mobile devices such as smartphones, tablets and POS. Already pre-Covid-19, IrisGuard demonstrated its pole position in one of the fastest growing vertical for biometrics: the refugee population. The company has forged full partnerships with the UNHCR, WFP and other aid agencies to offer financial assistance and relief to 5 million + refugees in Lebanon, Jordan, Egypt and Iraq. Furthermore, IrisGuard has secured multiple rounds of funding from PE and VC investors (including Growthgate Capital, Goldman Sachs, and other regional investors); and has forged strategic JVs with postal services operating in its target territories.

Conclusion

It is still difficult to predict the full impact of the pandemic on the world. However, it is evident that economic repercussions will drive more and more people to become 'unbanked' and require financial assistance across the globe. Also, contactless means of payments are going to gain major footprints and FinTech e-payments will become the new norms post-Covid-19.

True to form, in China, tablets affixed to the back of bus drivers' seats record passengers' body temperatures and take snapshots of their faces. The photos are used later for contact tracing if a passenger tests positive for coronavirus. Dermalog, a biometrics company that develops fingerprint, iris and facial recognition technology, has now added a feature to determine temperature and is pitching it as a new security feature to companies. The Thai government is already using Dermalog's technology as part of its border control system. Wisisoft, another biometrics player, says it has developed a 3D facial recognition in conjunction with Sichuan University that can identify people wearing masks with 98% accuracy and collect their body temperatures. One hospital in Chengdu has already deployed 140 units of the company's product.

FinTech & Iris Recognition Technology
Impact & Opportunities During Covid-19
May 2020

Companies that had a stronghold in the verticals boosted by the Covid-19 pandemic either geographically (EMDE), technologically (contactless technology), or in terms of products (e-payments) and sectors (refugees, unbanked, blue-collar and remittances) will emerge as winners from this crisis. That is if they know how to use this competitive advantage to its full potential and leverage their already existing R&D to become an integral part of the applications that seem to be lasting for the foreseeable future and beyond.

FinTech & Iris Recognition Technology
Impact & Opportunities During Covid-19
May 2020

REFERENCES & SOURCES

In addition to the sources cited in the various sections, all data and information provided in this paper have been taken from reliable and trusted sources.

Preamble

- IMF

Market Growth Pre-Covid-19

- Markets and Markets
- Market Watch
- Mordor Intelligence
- PR Newswire
- TopTal – State of the FinTech Industry
- PayPal Corporation
- PwC – FinTech Report
- InkWood Research
- Iris ID
- Jon Frost, Senior Economist of Innovation and the Digital Economy at Bank for International Settlements – “The economic forces driving fintech adoption across countries”
- World Bank
- Biometrics Update
- United Nations

The Impact of Covid-19

- PRNewswire
- Biometrics Technology Today
- Source Security
- Genome Survey
- Federal Deposit Insurance Corporation
- CNBC

FinTech Sector Analysis during Covid-19

- Reuters
- Eikon
- Bloomberg

Conclusion

- Find Biometrics
- Reuters