Bloc Ventures is a London-based venture capital (VC) company that has built its reputation in UK and European deep tech, focusing primarily on cloud, data, connectivity and security for telecoms and computing applications. It is one of very few specialist investors exclusively focused on early-stage Seed+, Series A investment, with an experienced (ex-Arm, Vodafone), networked management team. Structured as a permanent capital investment company, Bloc has built a portfolio of 11 investee companies, aiming for two to four new balance sheet investments a year from 2021. Bloc delivered a 59% NAV/share gain in FY20 and is targeting a 20%+ IRR over the long term. Following a likely funding round in the next 12 months, later-stage funding options may include an IPO in 2023.

Deep tech: A sector with unique dynamics

The sector has attributes that differentiate it from more general investment sectors:

- Deep tech typically requires R&D investment, often supported by grant funding.
- Technologies take time to reach maturity, but offer deep moats when they do.
- Investor risk is therefore technology rather than market focused.
- Progress is measured by technical as well as commercial milestones.
- Lower competition to provide capital drives attractive pricing.

Management team with deep sector expertise

Bloc has a team of nine, including ‘technologists’ with a strong track record in corporate venturing and VC, with expertise of building, buying, investing and managing technology companies, as well as the global network of contacts needed to inform investment decisions and provide market access to operating entities.  

Bloc was founded by CEO Bruce Beckloff (ex Arm), CTO David Leftley (ex Vodafone) to fill an identified gap in Europe for expert-led funding of early-stage deep tech companies. Michael Dimelow joined as CCO in 2021 (ex Arm, ADV).

To deliver strong returns, early-stage investment in deep tech demands specialist investors, with the insight, track record, patience and strategic network to identify attractive technologies and work with management teams to unlock their value.

59% FY20 NAV/share growth, 20%+ targeted return

The company has raised total funds of £28.4m since 2015, of which £4.5m was held in cash (or near cash) as at 31 December 2020, with Bloc reporting a portfolio book value of £32.5m and NAV of £37.4m (although we note that NAV is a trailing indicator, particularly so for high-growth companies). Bloc delivered 59% y-o-y NAV/share growth in FY20 and is targeting an annual shareholder return of 20%+ on an average 3–5x lifetime portfolio company return.

Bloc Ventures: Big plans for the future

Bloc completed a £20m Series B round in 2020 and envisages raising capital over the next 3–4 years. We would not rule out a potential raise in the next 12 months, with the option for an IPO in 2023. At that stage, the portfolio should be maturing, helping Bloc to establish a self-funding, permanent capital model. Other funding options might include the creation of side funds.
Bloc Ventures: Chart snapshot

Exhibit 1: Portfolio summary

<table>
<thead>
<tr>
<th>Segment</th>
<th>Stage</th>
<th>Stage investment</th>
<th>Cost</th>
<th>Book value Dec-19</th>
<th>Investments/realisations</th>
<th>Change in book value</th>
<th>FX</th>
<th>Book value Dec-20</th>
<th>Total return*</th>
<th>ROI</th>
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<tbody>
<tr>
<td>Marmalade**</td>
<td>Series-B</td>
<td>Jun-15</td>
<td>3.3</td>
<td>7.2</td>
<td>(1.5)*</td>
<td>8.0</td>
<td>-</td>
<td>13.8</td>
<td>15.6</td>
<td>4.8x</td>
</tr>
<tr>
<td>YellowDog</td>
<td>Series-A</td>
<td>Dec-17</td>
<td>4.0</td>
<td>3.0</td>
<td>1.5</td>
<td>-</td>
<td>-</td>
<td>4.5</td>
<td>4.6</td>
<td>1.1x</td>
</tr>
<tr>
<td>AccelerComm</td>
<td>Series-A</td>
<td>Dec-18</td>
<td>3.0</td>
<td>1.5</td>
<td>1.5</td>
<td>0.8</td>
<td>-</td>
<td>3.8</td>
<td>3.8</td>
<td>1.3x</td>
</tr>
<tr>
<td>Zeetta</td>
<td>Series-A</td>
<td>Jun-17</td>
<td>2.3</td>
<td>1.3</td>
<td>1.0</td>
<td>-</td>
<td>-</td>
<td>2.3</td>
<td>2.4</td>
<td>1.1x</td>
</tr>
<tr>
<td>Pharrowtech</td>
<td>Seed</td>
<td>Jun-19</td>
<td>2.2</td>
<td>1.1</td>
<td>1.1</td>
<td>- 0.1</td>
<td>-</td>
<td>2.2</td>
<td>2.2</td>
<td>1.0x</td>
</tr>
<tr>
<td>Yordex</td>
<td>Seed</td>
<td>Dec-18</td>
<td>1.5</td>
<td>1.0</td>
<td>0.5</td>
<td>-</td>
<td>-</td>
<td>1.5</td>
<td>1.5</td>
<td>1.0x</td>
</tr>
<tr>
<td>Crypta Labs</td>
<td>Seed</td>
<td>May-19</td>
<td>1.5</td>
<td>0.8</td>
<td>0.8</td>
<td>-</td>
<td>-</td>
<td>1.5</td>
<td>1.6</td>
<td>1.1x</td>
</tr>
<tr>
<td>EVRYTHING</td>
<td>Series-B</td>
<td>Feb-17</td>
<td>1.0</td>
<td>0.9</td>
<td>0.2</td>
<td>-</td>
<td>-</td>
<td>1.1</td>
<td>1.1</td>
<td>1.1x</td>
</tr>
<tr>
<td>Paytia</td>
<td>Seed</td>
<td>Sep-20</td>
<td>1.0</td>
<td>-</td>
<td>1.0</td>
<td>-</td>
<td>-</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0x</td>
</tr>
<tr>
<td>Mindtrace***</td>
<td>Seed</td>
<td>Jan-21</td>
<td>1.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0x</td>
</tr>
<tr>
<td>Tether Tech</td>
<td>Seed</td>
<td>Nov-17</td>
<td>0.9</td>
<td>0.7</td>
<td>0.1</td>
<td>-</td>
<td>-</td>
<td>0.9</td>
<td>0.9</td>
<td>1.0x</td>
</tr>
<tr>
<td>Total portfolio value</td>
<td></td>
<td></td>
<td>21.5</td>
<td>17.4</td>
<td>6.2</td>
<td>8.9</td>
<td>0.1</td>
<td>33.5</td>
<td>35.7</td>
<td>1.7x</td>
</tr>
</tbody>
</table>

Source: Bloc Ventures. Note: *Including cash returns and interest. **Marmalade made a £1.5m return of capital to Bloc in FY20. ***Mindtrace was closed post period end, but is included for completeness.

Exhibit 2: FY20 portfolio by value invested

Exhibit 3: FY20 portfolio book value

Exhibit 4: Growth in fully diluted NAV per share

Source:Bloc Ventures (adjusted for Mindtrace)
Bloc Ventures: Overview

Having identified a funding gap in the European deep tech market, Bloc Ventures was established by Bruce Beckloff and David Leftley in 2013 to provide early-stage investment in the European deep tech sector, making its first significant investment (Marmalade) in 2015, before building out the portfolio from 2017. Bloc Ventures is focused on Seed+ and Series A investments, with a portfolio of 11 investee companies offering solutions in supercomputing (YellowDog), an alternative to fibre broadband (Pharrowtech) and cloud-based phone payments (Paytia) (see Appendix for company profiles for the full portfolio).

Bloc’s unique selling points

The following factors help differentiate Bloc from competing investment propositions:

- **Management team**: Bloc’s experienced nine-strong team combines ‘technologists’ with science backgrounds and in-house commercial experience in the tech industry (Arm and Vodafone), with experience in VC, finance and technology company management. The team has established a global network of sector relationships built up through transactions over many years with global tech leaders such as Apple, Amazon, Qualcomm and Intel.

- **Sector focus**: whereas other VCs may offer deep tech as part of their portfolio, Bloc focuses exclusively on deep tech, meaning it has a greater depth of understanding of the sector and has been able to structure the investment vehicle around the sector opportunity, a permanent capital vehicle without a fixed fund life that might force premature realisations. Bloc focuses primarily on cloud, data, connectivity and security for telecoms and computing applications.

- **Addressing a gap in the market**: Bloc focuses on early-stage investment in European deep tech. Investment at these early stages requires a level of diligence and expertise that not all investors possess. When taken together with the longer investment horizon for deeply technical projects, this means reduced investor competition and relatively lower valuations. Most VC investors choose to invest in Series B and beyond, where the opportunity is clearer, the investment time horizon shorter and funding rounds are larger.

- **Supportive ‘Day-Two’ culture**: as an active investor, Bloc has a defined investment approach, including a ‘Day-Zero’ pre-investment due diligence phase, the ‘Day-One’ investment and a ‘Day-Two’ post-investment involvement in optimising and scaling the business; providing strategic operational guidance, leveraging its network and guiding start-ups towards future finance, including providing a 200-page financial playbook. This helps to establish a strong commercial framework around the investee company’s core technology.

- **Corporate structure aligns interests**: Bloc has been established as a permanent capital investment company, meaning stakeholders, be they founders, management or third-party investors, all participate in the investment upside.

- **Robust governance framework**: drawing from prior FTSE 100 experience, management has established a robust governance framework with an independent board providing a level of oversight more typical of a public company. Chair and Co-founder Paul Roy was executive vice president at Merrill Lynch, founder of New Smith, as well as being on the board of Sky Betting and S4 Capital, among other roles. Management biographies can be found on pages 15–16.
The company: Bloc Ventures

Management: Lowering the risk of investing in deep tech

Bloc was founded in 2013 by CEO Bruce Beckloff and CTO David Leftley, technology industry veterans from Arm (Bruce headed corporate development and corporate venturing) and Vodafone (David was European head of VC), together with Chairman Paul Roy (founder and CEO of multiple financial businesses) to fill an identified gap in Europe for expert-led funding of early-stage deep tech companies. Andrew Griffin joined as CFO in 2019 (ex Merrill Lynch), reinforcing Bloc’s financial capabilities. Michael Dimelow joined as CCO in 2020 (ex Arm, ADV), further strengthening the team.

Bruce Beckloff (CEO) started his career with Texas Instruments (TI), before joining Arm in Silicon Valley, then relocating to the UK to work directly with the executive at Arm. In total, he spent 12 years at Arm, becoming overall head of corporate strategy and corporate development, as well as overseeing Arm’s corporate venturing investment activity. He was named one of the most influential corporate venture capitalists (CVCs) in the 2012 Global Corporate Venturing Powerlist 100.

David Leftley (Bloc’s CTO) also brings substantial technical and operating experience, having worked as an engineer for 15 years prior to joining Vodafone, where he became chief engineer for technology evaluation and subsequently ran the company’s Venture Capital investment team across Europe over a 14-year career with the company. Two of his former team at Vodafone have subsequently joined Bloc Ventures, enhancing Bloc’s operational experience.

Bloc benefits from the experience of these ‘technologists’ with science backgrounds and commercial experience in the tech industry (Arm and Vodafone), allowing the team to carry out much of its investment due diligence itself, reducing its reliance on third-party advisors and minimising costs.

Together, the team has a strong track record of corporate venturing and VC across hundreds of successful transactions, with expertise in building, buying, investing and managing technology companies, as well as the global network of contacts needed to inform investment decisions and provide market access to operating entities. This demonstrable experience and network, together with the company’s permanent capital structure, make Bloc an attractive proposition to founders.

Addressing a gap in the market

Bloc focuses on early-stage investment at the Seed+ and Series A stages, bridging the ‘go-to-market’ gap between specialist deep tech investors and generalist VC funds highlighted in Exhibit 5. To deliver strong returns, early-stage investment in deep tech demands specialist investors, with the insight, track record, patience and strategic network to identify attractive technologies and work with management teams to unlock their value. When bundled together with the longer investment horizon for science-based projects, this means reduced competition from other potential investors and relatively lower valuations. Most generalist VCs choose to invest at Series B and beyond, where the opportunity is clearer, the time horizon is shorter and funding rounds are larger, even if this means substantially higher valuations.
Exhibit 5: Deep tech funding gap at seed and Series A stages

Source: europeanstartups.co/reports/2021-the-year-of-deep-tech

Investing in the ‘picks and shovels of the digital world’

Digitisation of established markets is a theme followed by most VCs, with COVID-19 being broadly viewed as an acceleration of the digital transition. The proliferation of capital now being invested in digitisation creates high levels of competition for the best investment opportunities, raising valuations and increasing risk to the start-ups trying to deliver against aggressive investment expectations.

Considered as an enabler of digitisation, deep tech represents an attractive but underserved subset of the digitisation theme. This is why Bloc considers itself to be investing in the ‘picks and shovels of the digital world’.

Exhibit 6: Bloc invests in the deep tech layer underpinning consumer innovation

Source: Bloc Ventures

For Bloc Ventures, deep tech means products and intellectual property created by engineering science in the form of middleware, enterprise software, semiconductor design, telecoms or computer systems. Bloc looks to invest deep in the technology stack, in the tools that enable innovation and process improvement and lower the marginal cost of the tech stack as a whole.

Deep tech technologies are B2B, offer a global market potential and are often invisible to the end consumer, yet deep tech enables the consumer digital revolution.

Similar to the pharmaceuticals sector or oil & gas, the deep tech sector benefits from the fact that large technology companies effectively outsource R&D to start-ups, acquiring technologies only
once they have been de-risked and sales can be accelerated through the acquiror’s existing sales channels. This means that there is a receptive pool of acquirors for Bloc’s portfolio companies.

**The £1bn Bloc**

In the next 12 months, we anticipate that Bloc will raise a further funding round. This follows the £8.4m Series A round completed in 2018 and the £20m extended Series B completed in September 2020. The next funding round would provide follow-on funding for Bloc’s existing portfolio as well as to allow management to maintain the company’s investment momentum, supporting two to four new investments per year off its balance sheet from FY21–23. In FY23, management anticipates a further larger funding round of up to £100m, which could be in parallel with, or ahead of, a potential IPO of the business. By that stage, some eight years after Bloc’s first significant investment in 2015, the portfolio should be maturing with a track record of exits as well as investments helping the company to establish a self-funding, permanent capital model. Bloc’s management intends to use an IPO as the springboard to achieving a £1bn valuation, following a similar trajectory to Draper Esprit.

**Exhibit 7: Bloc’s strategic journey to the £1bn Bloc**

![Diagram showing Bloc’s strategic journey]

*Source: Bloc Ventures*

**Market overview: The deep tech sector**

**Technology based on engineering and scientific innovation**

Deep tech is defined as technology based on engineering innovation or scientific research. Deep tech companies are often based on fundamental and defensible engineering innovations that distinguish them from companies based on the delivery of standardised technologies or that only use business model innovation to create opportunities (‘shallow tech’). Deep tech sectors include advanced materials, AI, biotechnology, blockchain, robotics, photonics, electronics and quantum computing.

According to [Boston Consulting Group](https://www.bcg.com) (BCG), global private investment in deep tech increased by 42% a year from 2016–20, reaching almost US$62bn in 2020 (May 2021). In Europe, the amount invested in deep tech rose by almost 24% a year from 2015–20 (Dealroom), with a high watermark of €9.6bn invested in 2019 and €9.4bn in 2020 (based on annualised data to September), three times the total investment in 2015 (Exhibit 8).
The demand for significant early-stage funding for R&D, together with the lengthy investment period, forces deep tech start-ups to abandon the usual funding progression from friends and family, to angel and seed investment, to Series A and subsequent funding rounds, ultimately leading to a trade sale or IPO. Instead, deep tech start-ups need to find alternative pools of patient and strategic capital (including corporate VC).

The key attributes that differentiate the sector from other investment sectors (eg consumer) are:

- Deep tech is increasingly seen as a strategic resource that the UK government wants to support, attracting non-dilutive government funding from, for example, Innovate UK, Future Fund and the British Business Bank.

- Technologies may take a long time to reach commercial maturity, with early-stage investment not always well suited to a typical fund investment horizon of five to eight years, including a two- to three-year initial investment period followed by a three- to five-year exit period.

- Deep tech is under-served by VCs due to the view that deep tech is a hard sector for generalist VCs, with sector expertise critical, both in pre-investment due diligence as well as post-investment, requiring active monitoring and support.

- Strong defensive characteristics – driven by digitisation, deep tech has become increasingly indispensable as an enabler of cost reduction and productivity improvement across industries. The cloudification of services has enhanced operational flexibility as well as reducing upfront technology costs, spreading costs evenly over the usage lifetime of a service.

- There can be a requirement for substantial capital investment to fund R&D – although R&D often attracts grant funding, investors either need to anticipate later dilutive rounds or to be able to participate in larger funding rounds.

- Exits are often to strategic partners, based on achievement of key milestones with only a small proportion of investments progressing to full commerciality and IPO – Bloc’s sector credibility and network of strategic contacts, with the potential to be strategic partners, is critical to support management and provide third-party validation of the technology and its applications.

European deep tech: An under-served opportunity

Many deep tech businesses are being spun out of Europe’s leading universities and, as such, Europe offers some of the most exciting and innovative deep tech prospects (eg ASML, Infineon, Hexagon, ICEYE, IQM, UiPath and Darktrace). Historically, however, Europe has lacked the scale-up capital (compared to the US and China) to commercialise these technologies on a global scale.
The deep tech ecosystem

Deep tech attracts a range of different stakeholders, including major corporations, universities and governments. Deep tech R&D is no longer purely driven by academics but is now more likely to be led by an entrepreneur (whether academic or otherwise), drawing from scientific research to develop an application for a given technology more quickly than the incumbents. What has changed is a growing deep tech ecosystem that facilitates research into many kinds of technology and the ability of the individual to access technological capabilities, financing and other critical resources.

Platform-driven acceleration in innovation

Innovation is often driven by emergent platform technologies, paving the way for subsequent phases of innovation. Underpinning the digital economy are systems developed through decades of fundamental research, applied innovation into new technologies, creative algorithms, manufacturing techniques and disruptive use cases. The first wave of technological innovation was initially dominated by the development of semiconductors underpinned by the doubling of raw computing power every two years (Moore’s Law). The focus then started to shift to telecoms equipment, mobility and wireless technologies that laid the framework of today’s hyperconnected world.

Platform technologies are emerging in software (machine learning) as well as hardware (quantum computing). Entrepreneurs have access to a wealth of technological capabilities via inexpensive and increasingly powerful PCs, with ever-more powerful cloud-based services, available flexibly and cost effectively from the likes of Amazon, Microsoft, Google, Alibaba and IBM. The mobile phone provides the ideal direct channel for data to the consumer. This access to hardware obviates the need for large upfront capital expenditure, with software also both open-source and widely available as a service.

This convergence of platform innovations multiplies their potential and creates the kind of rich ecosystem and momentum that is set to drive continuing innovation in the deep tech sector well into the future.

Deep tech equals high growth

Below we introduce a few of the deep tech segments targeted by Bloc and its portfolio companies.

- **Telecoms (Zeetta, Pharrowtech, AccelerComm):** the telecoms industry is at the centre of technological growth, led by mobile and broadband services in the IoT era. Gartner estimates that 20.4 billion connected devices were in use in 2020. Growth is expected to continue, with Technavio predicting the global telecom IoT analytics market will post a CAGR of more than 33% over 2018–22. Telcos are capitalising on these opportunities by leveraging the huge volumes of big data from their customer bases, processing and analysing data to launch new...
products and services offering a better customer experience, operational improvements and increased revenue.

- **Computing (YellowDog, Marmalade, Mindtrace):** the growth of the cloud and AI are two of the major themes driving growth in the computing segment. According to Research and Markets, the global cloud computing market is expected to grow at a 17.5% CAGR from 2020–25. Other opportunities in computing stem from the increasing use of AI, based substantially on advances in the field of machine learning – the ability of a computer to learn without explicit programming. The improved design of machine-learning algorithms, combined with increasing computer power, has led to the successful implementation of AI in autonomous mobility, voice assistants, medical-imagery analysis, big data analytics etc. Tractica projects that global revenues for AI software will grow at a 43% CAGR from 2018–24.

- **Post quantum computing (Crypta Labs):** quantum computers leverage the unique properties of matter at nanoscale, with quantum computing built not on bits, but on qubits. The unique properties of qubits enable them to solve certain calculations that are problematic for classical computers (eg cryptography, protein-drug interactions) far more easily. Quantum computing opens up new fields of technology, but also exposes established classical technologies (eg cryptography). Quantum computing is projected to grow at 56% CAGR from 2020–30 (P&S Intelligence).

- **IoT (EVRYTHNG, Tether Technology):** IoT is about networks, devices and data. IoT refers to the billions of physical devices around the world that are now connected to the internet, all collecting and sharing data. With affordable memory chips and the ubiquity of wireless networks, anything from a piece of clothing to an aeroplane can be part of the IoT. Connecting all these different objects and adding sensors to them adds a level of digital intelligence to devices, enabling them to communicate real-time data without human intervention and making the world around us smarter and more responsive. End user spending on IoT is forecast to grow at a CAGR of 39% from 2017–25 (Statista).

- **Fintech (Paytia, Yordex):** Bloc has also invested in fintech, forecast to grow at a CAGR of around 20% between 2020 and 2025 (IndustryARC). Yordex has developed a B2B financial management software suite that allows SMEs to manage company cards, expenses, invoices and budgets with smart approval rules. Paytia bridges telecoms, fintech and regtech by providing a secure cloud-based telephone payment solution for businesses, allowing staff to take payments without needing to handle sensitive card data, reducing costs and the potential for fraud.

Considering the nature of the deep tech sector as outsourced R&D, the default expectation for deep tech companies is for an exit to a strategic buyer rather than an IPO. A key part of Bloc’s approach is therefore to identify potential commercial acquirers prior to investment as well as to develop relationships with strategic partners during the investment holding period.

**COVID-19 highlighted tech’s strong defensive credentials**

As was demonstrated in 2020, with the onset of COVID-19, technology has become increasingly indispensable as an enabler of cost reduction and productivity increases, underlining the sector’s resilience and defensive growth credentials. Following the 2008 financial crisis, the cloudification of services has offered increased operational flexibility (enabling office systems to be accessed remotely) as well as reducing high up-front technology costs, spreading costs evenly over the lifetime of the service. This is all part of the ongoing digital transformation.
Portfolio overview

Exhibit 10: Marmalade an early exception to Bloc’s deep tech theme

Bloc Ventures made its first significant investment in 2015, when it opportunistically bought a stake in Marmalade. At that time, Marmalade was a technology-led B2B business, providing a technology suite (software development kit (SDK)) to mobile games developers. Alongside new management, Bloc led the company’s pivot to a games studio, building products directly for the consumer (with Bloc’s co-founder Bruce Beckloff as interim CEO). This pivot has been successful for Marmalade, leading to the business generating EBITDA of £5.2m in FY20, making a return of capital of £1.5m to Bloc, as well as delivering a fair value gain on Bloc’s remaining stake of £8.0m.

Since its first investment, Bloc has taken stakes in a further 10 companies, largely in the B2B deep tech sector, with four in 2017, two in 2018, two in 2019, one in 2020 and the latest in Q121. As a mature B2C business, Marmalade remains a very successful outlier within Bloc’s early-stage B2B portfolio.

Exhibit 11: FY20 uplift in book value

<table>
<thead>
<tr>
<th>£m</th>
<th>Initial investment</th>
<th>Cost</th>
<th>Book value as at 31-Dec-19</th>
<th>FY20 additions/ (realisations)</th>
<th>Revaluation</th>
<th>FX</th>
<th>Book value as at 31-Dec-20</th>
<th>% of FY20 book value</th>
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<tbody>
<tr>
<td>Marmalade</td>
<td>Jan-14</td>
<td>3.3</td>
<td>7.2</td>
<td>(1.5)*</td>
<td>8.0</td>
<td>-</td>
<td>13.8</td>
<td>42%</td>
</tr>
<tr>
<td>YellowDog</td>
<td>Dec-17</td>
<td>4.0</td>
<td>3.0</td>
<td>1.5</td>
<td>-</td>
<td>-</td>
<td>4.5</td>
<td>14%</td>
</tr>
<tr>
<td>AccelerComm</td>
<td>Dec-18</td>
<td>3.0</td>
<td>1.5</td>
<td>1.5</td>
<td>0.8</td>
<td>-</td>
<td>3.8</td>
<td>12%</td>
</tr>
<tr>
<td>Zeetta</td>
<td>Jun-17</td>
<td>2.3</td>
<td>1.3</td>
<td>1.0</td>
<td>-</td>
<td>-</td>
<td>2.3</td>
<td>7%</td>
</tr>
<tr>
<td>Pharrowtech</td>
<td>Jun-19</td>
<td>2.2</td>
<td>1.1</td>
<td>1.1</td>
<td>-</td>
<td>0.1</td>
<td>2.2</td>
<td>7%</td>
</tr>
<tr>
<td>Yordex</td>
<td>Dec-18</td>
<td>1.5</td>
<td>1.0</td>
<td>0.5</td>
<td>-</td>
<td>-</td>
<td>1.5</td>
<td>5%</td>
</tr>
<tr>
<td>Crypta Labs</td>
<td>May-19</td>
<td>1.5</td>
<td>0.8</td>
<td>0.8</td>
<td>-</td>
<td>-</td>
<td>1.5</td>
<td>5%</td>
</tr>
<tr>
<td>EVRYTHING</td>
<td>Feb-17</td>
<td>1.0</td>
<td>0.9</td>
<td>0.2</td>
<td>-</td>
<td>-</td>
<td>1.1</td>
<td>3%</td>
</tr>
<tr>
<td>Payia</td>
<td>Sep-20</td>
<td>1.0</td>
<td>-</td>
<td>1.0</td>
<td>-</td>
<td>-</td>
<td>1.0</td>
<td>3%</td>
</tr>
<tr>
<td>Tether Tech</td>
<td>Nov-17</td>
<td>0.9</td>
<td>0.7</td>
<td>0.1</td>
<td>-</td>
<td>-</td>
<td>0.9</td>
<td>3%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>20.5</td>
<td>17.4</td>
<td>6.2</td>
<td>8.9</td>
<td>0.1</td>
<td>32.5</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Bloc Ventures. Note: *Marmalade made a £1.5m return of capital to Bloc in FY20.

Bloc expects to make an average of between two to four new investments a year off its balance sheet, and as such we anticipate that Bloc will consider a funding round in the next 12 months (£3.1m cash (or near cash: cash in bank plus unspent (and returnable) cash on employee debit card account) as at 31 March 2021). As Bloc Ventures grows and develops, together with realisations and exits (the first of which is expected to be Marmalade), the portfolio should mature, helping the company to establish a self-funding, permanent capital model.
We provide only a high level of overview of the investment portfolio below, but in the appendix, we include more detailed profiles of each of the investee companies.

At end FY20, Bloc’s portfolio comprised the following 10 holdings.

**Exhibit 12: FY20 portfolio summary**

<table>
<thead>
<tr>
<th>Order</th>
<th>Company</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Marmalade – Pre-exit (42% of FY20 book value)</td>
<td>Mobile gaming, High-quality branded mobile games, Beachhead position with Hasbro, working with Sony, Other investors: Arm, Activision and angels, FY20: EBITDA £5.2m, 279% y-o-y growth</td>
</tr>
<tr>
<td>M</td>
<td>YellowDog – Series A (14% of FY20 book value)</td>
<td>Grid computing and cloud orchestration, Facilitates dynamically scalable commercial supercomputing, Targets intensive compute users: graphics, banking, aerospace, Other investors: Seeds, angels and founders, FY20: Pivot to global reseller-led model targeting eg pharma</td>
</tr>
<tr>
<td>M</td>
<td>AccelerComm – Series A (12% of FY20 book value)</td>
<td>Leading channel coding IP, Addresses key performance challenges for mobile, fibre and satellite communication channels via an IP licensing model, Strong ex Arm management, Other investors: Southampton University, IQ Capital, IP Group, FY20: 5x revenue increase, £5.5m Series A completed</td>
</tr>
<tr>
<td>M</td>
<td>Zeetta Networks – Series A (7% of FY20 book value)</td>
<td>Software defined network infrastructure, Simplifies network operations with easy deployment, Partnerships with Orange and Tata Communications, Other investors: IP Group, Breed and Bristol University, FY20: Won largest UK government award for industrial 5G, Targeting Series A strategic round in next 12 months</td>
</tr>
<tr>
<td>M</td>
<td>Pharrowtech – seed (7% of FY20 book value)</td>
<td>Ultra-high bandwidth wireless, Founded 2019 in Leuven, Belgium, spin out of IMEC, Cost-effective RF chips to solve ‘last mile’ speed issues, Other investors: IMEC, xpand, KBC, FY20: ‘Chip’ taped out, €15m Series A round planned</td>
</tr>
<tr>
<td>M</td>
<td>Yordex – seed (5% of FY20 book value)</td>
<td>Smart spend management and flexible financial tools, Part of the procure-to-pay market (2020: US$6bn), Founding team ex-Worldpay with proven track record, Other investors: angels, FY20: Targeting Series A strategic round in next 12 months</td>
</tr>
<tr>
<td>M</td>
<td>Crypto Labs – seed (5% of FY20 book value)</td>
<td>Quantum based encryption, Developing quantum random number generation IP, essential for the future of cyber security, Initial design-ins for smart automotive and secure comms, Other investors: IQ Capital, Founding team ex-ARM, FY20: $279m Series A funding, 5x revenue increase, £5.5m Series A completed</td>
</tr>
<tr>
<td>M</td>
<td>EVRYTHING – Series B (3% of FY20 book value)</td>
<td>IoT Platform, Connects physical products to the digital world, 500m managed physical/digital identities, Other investors: Generation Ventures, Swy, Cisco, Samsung, FY20: £224m ARR, £27m EBITDA, 50% growth</td>
</tr>
<tr>
<td>M</td>
<td>Paytia – seed (3% of FY20 book value)</td>
<td>Cloud-based telephone payment processor, Founded 2016, PCI-DSS Level 1 compliant, Reduces barriers to entry, remote-working secure, Other investors: angels, FY20: ongoing trial with an online payments co (300m subs)</td>
</tr>
<tr>
<td>M</td>
<td>Tether – seed (3% of FY20 book value)</td>
<td>Hybrid-edge and cloud-based CCTV platform, Lowers the complexity of use and the cost/complexity of deploying video security infrastructure, Other investors: Telefonica, Beacon, LOI, FY20: Scaling customer acquisition and ARR</td>
</tr>
</tbody>
</table>

Source: Bloc Ventures

**Mindtrace – Bloc’s 11th portfolio company**

Mindtrace (January 2021) is Bloc’s first artificial intelligence (AI) investment. Mindtrace has developed a software platform (Brain Sense) that enables computers to learn without repetitive instruction, digitising part of a human’s cognitive processing flow. The biggest cost component of most AI applications in the market today is training the AI, so Mindtrace’s product offers a material advantage. The resulting AI technology can be applied to multiple applications where visual image processing is required.

The core concepts that underpin Mindtrace were conceived in 2015 and the business received its first institutional capital investment in 2017. Post FY20 year-end, Bloc invested £1.0m as part of a £2.4m Seed+ round, with management targeting a Series A funding round in 2022. Sir Hossein Yassaie, the former CEO of Imagination Technologies and a serial investor in disruptive technologies, was appointed chairman in 2017, with Professor Steve Furber, the ICL Professor of Computer Engineering at the University of Manchester, also on the board.

Management’s priority for 2021 is to validate Brain Sense within key market verticals, including: retail analytics (fraud detection), asset/utility inspection (power lines) and gait analysis (ie human
These use cases are all heavily reliant on human supervision and, according to the company, represent a combined market value of US$5–20bn.

**Bloc’s investment process**

**Sourcing and approach**

Bloc secures deal flow pro-actively through its network of relationships and established ecosystem, as well as passively through the team’s market reputation attracting investment opportunities. Management has the experience and sector knowledge to dig deep in its due diligence to help identify potentially good investments from effective marketing. Furthermore, Bloc will only invest where it feels it has a competitive edge and where management can leverage Bloc’s ecosystem to add value to the potential investee company. Throughout the diligence process, as well as post-investment, Bloc seeks to build and maintain strong relationships with the management teams of its portfolio companies to become the company’s preferred investment partner.

**Exhibit 13: Bloc’s partner ecosystem**

Source: Bloc Ventures

**Bloc’s deal pipeline: A disciplined approach to deal flow**

Bloc’s deal flow derives from its network of global industry contacts, its founder-led approach and its reputation for technical knowledge and capabilities. Unsolicited approaches have increased as Bloc’s brand has become more widely known.

Bloc receives hundreds of approaches each year, including c 480 in 2020 (c 40 per month, compared to 31 per month in 2019), of which, utilising a disciplined and structured approach, only 22 made it into Bloc’s investment process, leading to two investments (0.4% of approaches) in that year. Bloc currently has 11 opportunities under evaluation (the stage prior to due diligence), as well as three at the discussion stage, but expects only between two and four opportunities to become portfolio investments each year.

The first lockdown affected the flow of inbound opportunities, however, this translated into pent-up demand once the initial shock of the pandemic subsided, with Bloc receiving twice the number of approaches over the summer months in 2020 as it had seen in 2019.

**Investment strategy: ‘Day-Zero’ and ‘Day-Two’**

With each opportunity, Bloc breaks the investment process down into a number of steps:
Identify (‘Day-Zero’) – Bloc’s approach has been refined over many transactions, using its in-house technical and financial expertise to identify attractive early-stage deep tech investment opportunities. An important consideration before Bloc commits to an investment is to identify how it can leverage its network to scale the company post-investment, make potential customer introductions, form partnerships and identify likely future acquirors of the business. Given the management team’s expertise and experience, most due diligence is conducted in-house.

Execute (‘Day-One’) – having identified attractive investment opportunities, Bloc is looking to secure two to four balance sheet investments per year, either as a sole investor or as a co-investor.

Optimise (‘Day-Two’ support) – as an active investor, Bloc is proactive in the governance of its portfolio companies, always taking a board seat. Bloc broadly divides its ‘Day-Two’ support into three phases: 1) providing strategic operational guidance, putting the correct structures in place for scale by helping investee companies optimise their business through commercialisation of the core technology, effective sales support and implementation of appropriate financial systems; 2) Bloc seeks to leverage its network, making commercial introductions to global enterprises; and 3) Bloc has a concept of ‘Readiness to Raise’, sharing a 200 page ‘ready to raise’ finance playbook guiding start-ups towards future finance, focused on: building the right team; creating a powerful narrative; modelling the funding round; and pitching to potential investors. Bloc helps with forecasting, sales and marketing, development of the business model and provides other professional services as and when needed.

Scale – post optimisation, Bloc continues to provide hands-on assistance to founders, using its network, particularly in the United States and Asia, to support global expansion. An active ongoing relationship with portfolio companies is a key differentiator for Bloc, which helps to maximise value creation and reduce investment risk.

**Investment structure: Bloc’s standard investment model**

Bloc’s core investment model is based around a £0.5–2.0m Seed+ or pre-Series A investment for a double-digit minority stake in a business, with the aim to invest up to £10m over time through to Series B and potentially beyond.

**Exhibit 14: Bloc de-risks the investment journey and accelerates value creation**

![Exhibit 14: Bloc de-risks the investment journey and accelerates value creation](image)

Source: Bloc Ventures

The initial investment is typically pre-Series A, when the business would be pre-revenue (although the company may have secured grant funding or have provided consultancy services to secure initial revenues), with a team of c 10–20 people. An investment of £0.5–2.0m at this stage usually delivers an equity stake of 20%+ with a 1x liquidation preference (a standard part of the VC toolkit, meaning that Bloc’s investment is repaid before the founders and other ordinary shareholders).
receive a return in the event of an early exit or corporate default). Where possible, Bloc has a preference to co-invest with other VCs, but particularly with early-stage investment, this can be challenging. As an active investor, Bloc always looks to take a board position, actively participating in decision making. Given that Bloc tends to take a minority stake in the company, it also expects board veto rights to protect its interests as a minority investor.

Between seed and Series A financing is where management’s focus moves from consultancy to product; the company refines its technology, applies for IP or patent protection and defines its go-to-market product set. At Series A, as the team expands beyond the core founder group, with a rising cost base and low or zero revenues, this tends to be the point of maximum cash burn. Thereafter, although the timing of revenues can vary considerably, once revenues start kicking in, it is a question of balancing costs with sales to scale the commercial roll-out and manage the company’s growth trajectory.

The point where a technology has found its market and become established is when strategic investors are likely to become interested, often initially coming in as co-investors before potentially acquiring the business once they can see how they can accelerate growth and drive value through pushing the new technology through their own sales channels.

Having made its initial investment, Bloc will look to participate in future funding rounds to protect its investment and avoid unnecessary dilution. Typically, funding rounds occur every 18 months and take at least six months to prepare for and complete, so management and Bloc are usually thinking about, if not actively engaged in, a funding round. Bloc would expect the pre-money valuation to at least double between funding rounds if the portfolio company is progressing well against its milestones, with funding rounds becoming ever larger as the company matures.

At Series B and beyond, Bloc and the company would work together to try to bring in appropriate strategic investors who might later become acquirors of the business. A critical part of Bloc’s value-add is to identify potential strategic investors as part of initial due diligence, later drawing on its network to introduce the strategic investor to the business and hopefully bring it in as a direct investor in the company as part of a later funding round.

**Bloc Ventures Limited**

**Management team and governance**

Bloc Ventures has a nine-strong operational team, with the four senior team members forming the Executive Committee managing the business, together with an independent board to represent shareholders’ interests.

Bloc Ventures has established a formal board structure, including non-executive directors, to provide effective governance. As well as Paul Roy, non-executive chairman, Bloc has two experienced non-executive directors, Stephen Catlin (Catlin Group, XL Group) and Samantha Wren (IPGL, NEX Group), representing shareholders and providing investment stewardship.
Exhibit 15: Management’s deep tech track record stretches back over more than 10y (£m)

<table>
<thead>
<tr>
<th>Company</th>
<th>Total Investment (£m)</th>
<th>Total Proceeds (£m)</th>
<th>IRR (%)</th>
<th>Cash Multiple</th>
<th>Exit Date</th>
<th>Exit Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thunderleft</td>
<td>0.83</td>
<td>30.70</td>
<td>67%</td>
<td>33.50x</td>
<td>2015 IPO</td>
<td>2015 IPO</td>
</tr>
<tr>
<td>Affirmed Networks</td>
<td>2.85</td>
<td>24.79</td>
<td>38%</td>
<td>34.50x</td>
<td>2020 TradeSale</td>
<td>2020 TradeSale</td>
</tr>
<tr>
<td>Mobile Iron</td>
<td>0.83</td>
<td>5.79</td>
<td>NA</td>
<td>7.0x</td>
<td>2014 IPO</td>
<td>2014 IPO</td>
</tr>
<tr>
<td>UIPath</td>
<td>0.38</td>
<td>2.30</td>
<td>234%</td>
<td>66x</td>
<td>2020 Secondary</td>
<td>2020 Secondary</td>
</tr>
<tr>
<td>Perfect Mobile</td>
<td>1.93</td>
<td>7.55</td>
<td>22%</td>
<td>49x</td>
<td>2014 TradeSale</td>
<td>2014 TradeSale</td>
</tr>
<tr>
<td>Jibe</td>
<td>1.94</td>
<td>8.34</td>
<td>63%</td>
<td>43x</td>
<td>2015 TradeSale</td>
<td>2015 TradeSale</td>
</tr>
<tr>
<td>Carbon Design Systems Inc*</td>
<td>0.20</td>
<td>0.80</td>
<td>26%</td>
<td>40x</td>
<td>2015 TradeSale</td>
<td>2015 TradeSale</td>
</tr>
<tr>
<td>Arrowdocs</td>
<td>4.58</td>
<td>15.00</td>
<td>34%</td>
<td>33.50x</td>
<td>2012 TradeSale</td>
<td>2012 TradeSale</td>
</tr>
<tr>
<td>VoucherCloud</td>
<td>1.75</td>
<td>5.00</td>
<td>202%</td>
<td>32x</td>
<td>2012 TradeSale</td>
<td>2012 TradeSale</td>
</tr>
<tr>
<td>Pointy</td>
<td>0.10</td>
<td>0.28</td>
<td>82%</td>
<td>28x</td>
<td>2020 TradeSale</td>
<td>2020 TradeSale</td>
</tr>
<tr>
<td>Synergistic AI</td>
<td>0.95</td>
<td>1.60</td>
<td>37%</td>
<td>17x</td>
<td>2005 TradeSale</td>
<td>2005 TradeSale</td>
</tr>
<tr>
<td>Sea Micro</td>
<td>3.48</td>
<td>6.80</td>
<td>221%</td>
<td>16x</td>
<td>2012 TradeSale</td>
<td>2012 TradeSale</td>
</tr>
<tr>
<td>Artaris</td>
<td>0.73</td>
<td>1.20</td>
<td>13%</td>
<td>16x</td>
<td>2013 TradeSale</td>
<td>2013 TradeSale</td>
</tr>
<tr>
<td>WW</td>
<td>3.57</td>
<td>5.30</td>
<td>34%</td>
<td>15x</td>
<td>2006 TradeSale</td>
<td>2006 TradeSale</td>
</tr>
<tr>
<td>Sunrise Micro Devices Inc*</td>
<td>10.70</td>
<td>15.00</td>
<td>22%</td>
<td>15x</td>
<td>2015 TradeSale</td>
<td>2015 TradeSale</td>
</tr>
<tr>
<td>Pontia</td>
<td>3.45</td>
<td>3.94</td>
<td>0%</td>
<td>10x</td>
<td>2016 TradeSale</td>
<td>2016 TradeSale</td>
</tr>
<tr>
<td>Cogintro</td>
<td>8.54</td>
<td>8.60</td>
<td>0%</td>
<td>10x</td>
<td>2012 TradeSale</td>
<td>2012 TradeSale</td>
</tr>
</tbody>
</table>


The senior management team, which has huge experience in the sector, collectively boasts over 120 years of technology company experience, has been responsible for over £500m of investments and has managed c 25 exits valued at over US$5bn (Exhibit 15).

- **Paul Roy, chairman**, has over 40 years’ experience in financial services. He started his career at stockbroking firm Kemp Gee and subsequently became senior partner. In 1988, he joined Smith New Court as CEO, and merged the business with Merrill Lynch in 1995. He left Merrill Lynch in 2003 to found NewSmith Capital Partners, acquired by Man Group in 2015. He is former chairman of New River Retail and Sky Bet and is a NED at S4 Capital as well as senior adviser to Sumitomo Mitsui Trust Bank. He has a BA (Hons) in economics and an Honorary Doctorate of Law from Liverpool University.

- **Bruce Beckloff, co-founder and CEO**, spent 12 years at Arm, becoming overall head of corporate strategy and corporate development, as well as overseeing Arm’s corporate venturing investment activity. He was named one of the most influential corporate venture capitalists (CVCs) in the 2012 Global Corporate Venturing Powerlist 100. Bruce started his career with Texas Instruments (TI) after graduating with an MSc from the Georgia Institute of Technology. In 2001, Bruce joined Arm in the US, before moving from Silicon Valley to the UK to work directly with the executive at Arm. Bruce also has an MBA from Southern Methodist.

- **David Leftley, co-founder and CTO**, was chief engineer for technology evaluation and led Vodafone’s European corporate venture team (during his 14 years at Vodafone), when it was ranked as a top five CVC. David was included in Wired Magazine’s top 100 innovators list and named as one of the most influential CVCs in the 2012 Global Corporate Venturing Powerlist 100.

- **Andrew Griffin, CFO**, has worked with public and private technology companies to raise money and improve their operating models, assisting them in explaining their businesses to outside investors. Andrew spent 17 years in investment banking where, as a managing director in Merrill Lynch’s European technology equity research team, he was the number one ranked semiconductor analyst in Europe in 2000. He then spent eight years working directly for public and private VC funded technology firms.

- **Michael Dimelow, CCO**, brings a strong strategic, commercial and investment track record from 15 years in senior leadership positions at Arm and TTP Communications. Michael later co-founded Accelerated Digital Ventures (ADV), where he acted as CIO, helping to build a portfolio of over 30 companies including B-secur, Push Dr and UIPath, as well as deploying investments into funds including Entrepreneur First, IQ Capital and Seedcamp. Over his career, Michael has led teams responsible for investing over US$500m in deep tech businesses.

- **Dimitris Stoimenou, investment director**, has hands-on experience of driving commercial and technology innovation across the telecoms sector, gained through a wide variety of operational and strategic roles at Vodafone, Colt and Inmarsat. While at Vodafone he was
named on two patent applications. Dimitris has an MEng in electrical and electronic engineering from Imperial College London, and an MBA from London Business School.

- **Allan Bartlett, senior investment analyst**, has over 20 years’ experience of delivering new technologies with Motorola, Vodafone and the GSMA. He has led technology strategy projects, driving investment decisions, and brings a rigorous strategic and commercial approach to identifying investment focus areas. While at Vodafone he worked in its corporate venturing unit. Allan has four patents to his name and a PhD in high frequency communications from the department of Electrical and Electronic Engineering at the University of Leeds.

**Corporate structure aligns interests**

Being structured as a permanent capital investment company means that Bloc’s balance sheet investments are not tied to the five- to 10-year investment and exit cycle of a typical VC fund. However, Bloc is still open to raising a fund, which would enable a multi-stage investment strategy (with the balance sheet acting as a potential follow-on investor) and offer investors an alternative investment vehicle, while still being able to benefit from Bloc’s expertise.

Recognising that science-based companies often take longer than the standard investment cycle to deliver a return, Bloc’s balance sheet allows management to determine the most appropriate time to sell investments to maximise value or to continue to build value in the business.

The investment company structure aligns shareholder interests, with all stakeholders participating in the upside of the investment vehicle, as an alternative to the traditional VC limited partner (LP) and general partner (GP) arrangement.

Employee equity remuneration is principally granted by way of growth shares (through the long-term incentive plan (LTIP)), rather than carry, with growth shares converting to ordinary shares when performance hurdles are met and on exit/IPO. This structure should make an IPO more straightforward were Bloc Ventures to choose that path.

**Substantial shareholding exemption**

The substantial shareholding exemption (SSE) effectively removes the tax on Bloc’s investment gains when it exits an investment. The SSE allows UK corporates to sell interests in UK trading companies free of UK tax, where they have held at least 10% of the ordinary shares in the investee company for a minimum 12-month period beginning not more than six years before the disposal of the relevant shares in the investee company.

**Valuation methodology**

Bloc follows The International Private Equity and Venture Capital Valuation Guidelines for the valuation of private Investments, which set out best practice where private investments are reported at ‘fair value’. To date, other than Marmalade, the early-stage nature of Bloc’s portfolio has required Bloc to value assets based on ‘last price paid’, a conservative approach that means Bloc only sees an uplift in book value when portfolio companies raise follow-on equity, which then allows Bloc to revalue its stake based on the new valuation. Valuations will be marked up either at the next funding round when a new valuation is established, or, for later stage companies, when they are valued using a mark to market approach. This necessarily introduces a time lag between book value and ‘fair value’, with NAV operating as a trailing indicator.

Assuming Bloc’s portfolio companies start to deliver material revenue and profitability, Bloc will be required to ‘mark-to-market’ using public comparable valuation multiples. Marmalade is the first of Bloc’s portfolio companies to make this transition, with a third-party valuation (based on peer multiples, referenced to a DCF approach) later audited by Grant Thornton. This led to an £8m uplift
in book value for Marmalade in FY20. However, other companies are expected to transition to a mark-to-market valuation methodology as the portfolio matures.

**ESG: An emerging impact investor**

Bloc Ventures is committed to building and developing its responsible investment agenda, guided by the UN’s Principles for Responsible Investment, mindful of the fact that environmental, social and governance (ESG) awareness is associated with better business performance.

As an early-stage technology investor, supporting fast-growing companies that will create sustainable employment opportunities, Bloc Ventures exhibits many of the characteristics of an impact investor. The group intends to use its platform to encourage and promote its values across its portfolio, applying ESG considerations to develop leading technology companies and achieve strong investment returns.

Bloc also recognises that good governance is critical to its future success, with the group diligent in both internal governance as well as ensuring good stewardship across its investee companies.

**Financial overview**

**Exhibit 16: A resilient portfolio in 2020**

<table>
<thead>
<tr>
<th>Green: Solid execution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marmalade: £5.3m EBITDA in 2020 (279% YoY)</td>
</tr>
<tr>
<td>AccelerComm: £6m Series A and £5 revenue increase in 2020</td>
</tr>
<tr>
<td>Pharrows: &quot;Chop&quot; taped out and pre-sale, £15m Series A round initiated</td>
</tr>
<tr>
<td>Yordex: Targeting £1m ARR and £5m Series A round in 2021</td>
</tr>
<tr>
<td>Paytax: Investment completed and trials underway with a global online payments company (300m subscribers)</td>
</tr>
<tr>
<td>Everyting: ARR up 62% and potential merger in 2021</td>
</tr>
<tr>
<td>Tether: Technology: Targeting £1m ARR by Q4 (20x YoY)</td>
</tr>
<tr>
<td>Amber: Traction increasing</td>
</tr>
<tr>
<td>YellowDog: Pivot completed and significant engagement with global hyperscalers underway</td>
</tr>
<tr>
<td>Zeetta Networks: Won largest UK Government investment into an industrial 5G application</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Red: Market challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crypto Labs: Covid-19 has significantly delayed European activities, pivot to focus on UK projects</td>
</tr>
</tbody>
</table>

**Source:** Bloc Ventures

**Resilience to COVID-19 demonstrated in FY20**

Bloc’s portfolio proved robust in the face of COVID-19 in FY20, but was not entirely immune from its impact. As shown in Exhibit 16, three-quarters of the portfolio has continued to perform robustly, even benefiting from lockdown in the case of Marmalade (£8m uplift in book value). However, a quarter of the portfolio has suffered from exposure, particularly those companies that have reprioritised their sector focus (Zeetta, YellowDog) or those focused on business development (Crypta Labs). Nevertheless, with support from Bloc, YellowDog and Zeetta Networks have changed their focus and are once more building momentum. Crypto Labs has pivoted away from Europe to focus on the UK, but has yet to see the benefit of this change of strategy.

Impacts from COVID-19 common to Bloc’s portfolio include the cancellation of Mobile World Congress (MWC-2020), which has traditionally played an important role in both sales and marketing in the telecoms sector. Recruitment of specialist international teams has also become more difficult, with a number of companies resorting to hiring key staff via video call, with new hires then having to work remotely. It goes without saying that extended travel restrictions would have an
impact on business development and slow recruitment further, significant issues for scaling businesses.

For Bloc, as with its portfolio companies, transitioning to remote working was required and implemented without issue. Bloc hired four people during the various UK lockdowns. Incoming deal flow slowed for a period, but soon returned in Q320. Bloc would undoubtedly credit the support of the UK government and access to matched funding from the Future Fund as a significant factor to managing the impact of COVID-19 on six investee companies: Zeetta Networks, Crypta Labs, Yordex, YellowDog, Tether and EVRYTHNG.

Financial structure: Alignment of interests

Structured as an investment company, rather than a typical VC GP/LP structure, investors and management all participate in the share capital of Bloc. Bloc’s capital is broken down between ordinary shares, A ordinary shares (ordinary shares with a supplementary 1x liquidation preference) and Employee A Growth shares (which convert to ordinary shares after a return hurdle of £50m is achieved). Management (excluding the non-executive directors) holds 12% of the ordinary shares and A ordinary shares.

Exhibit 17: Share capital as at 31 December 2020

Due to the 1x liquidation preference held by the Series A ordinary shares, £8.4m must be paid back to the Series A investors before the ordinary shareholders receive a return, equivalent to £25 per Series A ordinary share. This value is deducted from Bloc’s total NAV to calculate the NAV per share due to ordinary shareholders. This has the consequential effect of leveraging any increases in book value across the portfolio for ordinary shareholders. As further ordinary share capital is issued, the impact of this leverage is reduced. In the event of a share sale of Bloc in return for equity, or at IPO, Bloc has the option to repay the liquidation preference held by the Series A ordinary shares in equity rather than cash, reducing any dilution to the ordinary share capital.

NAV outlook: Further progress, organically reducing leverage

Largely due to the £8m fair value gain for Marmalade, Bloc’s fully diluted NAV (conservatively including the LTIP shares, even though performance hurdles have yet to be met) rose to £20.52 as at 31 December 2020, from £12.89 at 31 December 2019, a 59% increase. The Series B share price was £26.46, a 29% premium to the latest fully diluted NAV per share. It is worth reiterating that for investors in earlier-stage, high-growth businesses, which cannot be marked-to-market, NAVs tend to be a considerably backward-looking indicator of valuation.
Risk factors

A summary of the principal risk factors relating to Bloc Ventures is set out below:

- **Limited operating history**: Bloc was established in 2013, made its significant initial investment in 2015, before building out the portfolio from 2017, but has yet to exit any investments (although we understand that an initial exit may occur in 2021).

- **Early-stage business risk**: the early-stage nature of Bloc’s portfolio businesses carries a high degree of risk, with Bloc exposed to risks related to non-controlling investments. Not all of its investments will achieve their hoped-for potential.

- **Continuing access to capital**: deep tech companies in the seed and Series A stages are heavily reliant on investor funding, recognising that a lack of VC liquidity is a primary driver of start-up failure. To be successful, a VC needs sufficient cash to continue to support existing investments as well as to make new investments. Having extended its Series B round from £15m to £20m in 2020, Bloc is funded into 2021. Management envisages raising capital over the next three to four years and we would not rule out a potential raise in the next 12 months, with the possibility for Bloc to then IPO (potentially in 2023).

- **Potential for future dilution**: management anticipates two future group funding rounds before there is liquidity in the shares. If these funding rounds were priced below the current share price, existing shareholders would be diluted.

- **Liquidity events**: although Bloc has an initial liquidity event under discussion, Bloc has not yet achieved its first exit. Exits are uncertain and difficult to predict and proceeds from trade sales/IPOs are likely to vary substantially from year to year.

- **Reputation and deal flow**: Bloc is reliant on the reputation of its management team, its strategic contacts and Bloc’s ecosystem to source appropriate deal flow and deliver the quality of investment opportunity to drive attractive investment returns.

- **Valuation risk**: Bloc’s investments are difficult to value accurately, with valuation methodologies subject to significant subjectivity. There can be no assurance that the reported values of the company’s investments will be realised.

- **Portfolio concentration**: Bloc holds a relatively concentrated portfolio of 11 investments, with realisations and returns dominated by a limited number of investee companies. Concentration will reduce as further investments are made.

- **Technology sector**: the company is subject to risks associated with developments in the technology sector, including the escalating trade war between China and the US, as well as other unforeseen future developments.

- **COVID-19**: Bloc’s portfolio has seen both positive and negative effects of COVID-19, but a prolonged pandemic may have a further negative impact in particular on business development and investee company recruitment and cash flows.

Financials

We include Bloc’s financials for completeness but highlight that as an early-stage investment company, the key metrics to consider when looking at Bloc Ventures are NAV per share, cash available for investment and portfolio progress against milestones (including investee funding rounds and realisations) as an indicator of future appreciation in NAV per share. In this respect, the summary in Exhibits 18 and 19 below highlights the 51% y-o-y uplift in portfolio book value in FY20 (largely driven by Marmalade and investments) and the corresponding 59% y-o-y uplift in fully diluted NAV per ordinary share. Bloc held cash of £4.5m as at 31 December 2020, supplemented by £7.4m raised through the close of the Series B round and its extension round.
We would also note that the operating costs (net of fee income) fell to 3.0% of NAV in FY20 (FY19: 4.3%). The team size increased in FY20 from five to eight members (and nine in Q121).

Looking at Bloc’s income statement (Exhibit 20), there are relatively few other material points to draw out by way of analysis. Bloc’s principal source of revenue is from board fees chargeable to portfolio companies, with the fair value uplift from Marmala the major contributor to investment income.

In terms of cash, Bloc committed £7.7m of investments in FY20 (FY19: £4.3m), substantially funded by the close of the £7.4m Series B round and its extension round. Net cash at the end of FY20 amounted to £4.5m (FY19: £4.7m). Bloc envisages raising capital over the next three to four years and we anticipate a potential raise in the next 12 months in order to ensure that it can continue to invest in two to four companies per year off the balance sheet. Exits to date have been limited, with Marmalade delivering a return of capital of £1.5m in FY20. Marmalade remains the most likely candidate to deliver a realisation in the short term.
office equipment. Post year-end, Bloc Ventures committed £1.0m to its 11th investment, Mindtrace, with the investment being made in two tranches, in January and June 2021.

Valuation

As an early-stage company, Bloc’s portfolio has not yet reached the stage of maturity of its quoted peers, which makes a valid valuation comparison difficult to make. However, we would highlight the NAV track record that Bloc has achieved to date, with 59% y-o-y growth in fully diluted NAV per share in FY20, together with Bloc’s target annual return of 20%+.

Based on our analysis, the market is looking for options to invest in early-stage technology, recognising that technology IPOs are being pushed to a later stage. In the UK and European markets, technology exposure, particularly to pureplay high-growth themes such as deep tech, can be very difficult for public market investors to readily access.

Investors value investment companies more highly that have latent value and the potential to outperform, with clear differentiation, a high-growth portfolio and preferably a history of exits and value realisation. In this context, Bloc offers a clear sector focus, a structured investment process, an early stage-portfolio with high growth potential, and, by the time it comes to IPO, it will offer an increasingly diversified and mature portfolio.
Appendix

Marmalade Game Studio (mobile games, 41% of FY20 portfolio value, adjusted for Mindtrace)

Summary: Publisher of high-quality digital board games

Marmalade is a mobile games studio, developing and publishing high-quality digital board games as premium multiplayer titles on mobile (and increasingly PC and console titles). Marmalade has seven live titles (including Monopoly, Cluedo, Game of Life), with IP licensed from Hasbro. Marmalade's titles largely appeal to a Western audience with universal appeal – they are played by young and old, with an even male/female split. Marmalade has offices in London and Lisbon and employs c 53 staff.

Background: Success followed a Bloc-led pivot in 2016

Marmalade used to be known as Ideaworks3D, a developer of a technology suite (SDK) for developing mobile games. Backed by Bloc Ventures, Bruce Beckloff stepped in as interim CEO working with the current management team (Mike Willis, now CEO and Cristina Mereuta, now COO) to affect a turnaround of the business in 2016, pivoting it to a work-for-hire mobile game development model and laying off two-thirds of its staff in the process.

From its smallest point in early 2017 (17 staff), the company grew steadily to 33 employees in early 2019 and 53 staff in July 2020. In the process, the company built on its key relationship with Hasbro, from whom it licences the IP for each of its seven titles. However, the business has really taken off with the launch of Monopoly in November 2019, boosted by the impact of the global lockdown in Q2 2020. Marmalade’s latest title, Game of Life 2, was launched in July 2020. In 2021 Marmalade released a self-published game Jigsaw Video Party, which will launch Marmalade’s video multi-play-in-house platform being developed in cooperation with video conferencing and media platforms. Multi-play will then be rolled out across the portfolio of games.

Addressable market: Effectively unlimited

Mobile games is a US$77bn global market, growing at 13.3% y-o-y (Newzoo), but increasingly moving away from premium titles towards free-to-play (FTP) titles led by gamers in the Far East (China, Japan, Korea). With six billion smartphones and over 2.5 billion gamers worldwide, Marmalade’s market share only scratches the surface of the potential addressable market. Apple Arcade, launched in 2019, has helped stem the inevitable trend towards FTP, releasing high quality mobile titles to iPhone users as part of a £4.99 monthly subscription. Marmalade finds most of its subscribers (typically c 70%) are on Apple rather than Android devices.

Business model: Lucrative, even after platform and licence fees

Marmalade’s titles are sold via intermediaries (eg Apple, Android, Steam, console), all of whom tend to take a 30% revenue share. They are also based on licensed IP, which improves discoverability and reduces the need for direct marketing, with net revenues split between Hasbro and Marmalade after development and marketing costs. We estimate that Marmalade receives 50%+ of the headline sales price. Marmalade’s games cost up to £1m to create (launch title plus subsequent downloadable content) and are typically sold at a £2–5 price point on mobile, £15 on Steam and £20 on Switch (console). The advantage of the digital model is that marketing can be turned on and off depending on data-driven ROI analysis. As well as up-front sales, Marmalade also derives 30–50% of total revenues from in-app purchases and offers a ‘season pass’ at £35 that allows the subscriber unlimited access to all content for life for a given game (c 6% of subscribers to a title convert to the season pass).
COVID-19: Boom time – 279% y-o-y growth in revenues in FY20

Simply put, Marmalade has benefited significantly from the global lockdown in 2020, with gamers reaching for the family-friendly social and multiplayer mobile titles that Marmalade develops. As a digital publisher with seven titles on sale, including Monopoly only recent launched, Marmalade was well placed to benefit from surging demand.

Management: Experienced games developers

The core management team, Mike Willis, CEO, and Cristina Mereuta, COO, are experienced games developers who joined Marmalade after working for the AAA games publisher, Electronic Arts. They took over responsibility for the studio as part of the turnaround in 2016.

Strategy: Strengthening relationship with Hasbro, growing into new licensors

The studio has grown substantially through its relationship with Hasbro, which continues to strengthen. However, as Marmalade has grown with the launch of new products, the next step in its evolution has been to diversify the business, with franchise launches from two new IP licensors expected in 2021, together with a self-published title, Jigsaw Video Party, being launched on Marmalade’s own multi-player platform. The company will increasingly look to add new licensors in the future. The team has substantial prior experience developing its own IP.

Bloc value-add: A committed and supportive investor

Having stood by Marmalade and supported the new management team to pivot the business in 2016, Bloc has managed to pull off the balancing act required of a good investor. It has in turn provided the necessary finance, acted as CEO in the early days and then given management the space to execute on its strategy. Although Bloc is not a games sector specialist, Bloc has invested in a games development platform, supported its pivot and is now looking to sell a successful mobile games studio in a strong M&A market.
YellowDog (multi-cloud computing, 13% of PV)

Summary: Hybrid- and multi-cloud workload management platform

Through virtually aggregating millions of high-performance compute cores in the cloud, YellowDog provides a workload management platform for resource-intensive cloud computing that can be deployed to: 1) manage cloud costs and improve cloud performance; 2) improve cloud resilience and minimise reliance on a single provider; and 3) use in network distributed cloud computing to provide an on-demand high performance computing (HPC) solution for complex tasks. Although initial revenues were derived almost exclusively from rendering of computer-generated imagery (CGI), YellowDog has significant potential in pharmaceutical drug discovery (where it has held successful trials), for new chip design in the semiconductors sector, as well as the finance and insurance sectors. YellowDog has also invested in the YellowDog Index to provide real-time insight to global cloud/server capacity, pricing, and environmental impact – a first-of-a-kind offering.

Background: Multiple use cases catching the eye of the hyperscalers

YellowDog was founded in Bristol in 2015 by Gareth Williams. It has established its solution in animated movie rendering, a highly compute-intensive market, where contracts are increasingly moving from project-based to framework agreements. However, YellowDog’s technology has applications well beyond just CGI, and its capabilities can be replicated across multiple markets with complex compute requirements. As such, management is looking to diversify into new sectors such as life sciences, meteorology, financial services, and semiconductor design, with proof-cases and active engagements in each of these sectors.

These trials have caught the eye of the ‘hyperscale’ cloud providers (AWS, Azure, Google, IBM, Oracle) and under a new CEO (former CTO) Simon Ponsford, the company is looking to partner with cloud providers to deliver 100k+ virtual core compute engines, making complex compute applications more flexible and cost-effective. Based around these capabilities, the company has built a pipeline of customers which could each generate up to c £2m of ARR.

Technology: Scale, control and optimise cloud computing

YellowDog provides a Platform as a Service (PaaS) offering, together with the free YellowDog Index to support the sales pipeline.

The YellowDog Platform launched in 2019, allows a company to manage resource-intensive and high-performance computing workloads on time and on budget through coordinating multi-cloud access with in-house computer resources. An additional licence allows the use of YellowDog’s “Best Source of Compute”, launched in 2020, to identify the best available computing resources and make smarter infrastructure decisions, based on factors such as availability, cost, performance, latency, regulation, security and sustainability.

In H220, management released the YellowDog Index, a free-to-use visualisation tool that provides an analysis of the different instances offered by the main public cloud providers: Amazon Web Services (AWS), Google Cloud Platform, Microsoft Azure, Oracle Cloud Infrastructure and Alibaba Cloud. Based on the selected inputs, the YellowDog Index organises the data to help companies identify the instances that best match their specifications.

Addressable market: Workload management and cloud orchestration for compute-intensive services, US$2.25bn market by 2025

Businesses are increasingly moving to the cloud, recognising that on-premise computing resources are either constrained or underutilised and the cloud offers a better, more flexible solution. In terms of computing project work, business-critical, compute-hungry processes often overrun, leading to unnecessary costs. For critical services, using a single cloud or region increases the risk of service
failure, vendor lock-in, lack of server availability and poor performance. The ability to coordinate unused capacity for compute-intensive work has also created a completely new market, where previously you had to have access to a data centre.

With the prevalence of cloud, management and optimisation of multi-cloud usage remains a highly fragmented market, with the largest single competitor being individual company technology teams, managing resource allocation in-house. Specialist providers include: CloudSphere (application resource management), Rescale (application management and provisioning), Spot.io (cloud automation and optimization) (acquired by NetApp for US$450m) and Turbonomic (app resource management) (acquired by IBM for US$2bn).

Management estimates the total addressable market (TAM) for cloud orchestration for compute-intensive services in 2020 to be c US$1bn, growing to US$2.25bn in 2025.

Business model: Annual concurrently managed processor core fee plus a monthly fee per core hour to burst to higher numbers of cores
Annual pricing starts at US$13 per concurrent processor core and US$0.02 per processor core per hour to burst above annual committed amount.

COVID-19: Sales slowdown drove focus on life sciences
YellowDog has a foothold in the film and animation sector but has also identified opportunities in other sectors including financial services and life sciences. The pandemic has slowed business development activity and sales into new sectors, drawing out the sales cycle. Travel restrictions are an additional drag on new sales activity.

Funding: Series B round in FY22 to fund channel partnerships
The company is working with hyperscale channel partners to drive sales. The company is targeting a Series B round in FY22, potentially raising £5–10m.
AccelerComm (wireless channel coding, 11% of PV)

Summary: High performance decoding for mobile/fibre/satellite comms

Spun out of Southampton University IP and led by an ex-Arm management team, AccelerComm is developing physical layer solutions for use in 4G and 5G mobile, fibre and satellite communication networks. Its IP offers improved signal deciphering for a given signal to noise ratio, delivering ultra-low latency and a 10x increase in cost-price-performance. This offers a significant increase in network sensitivity, effectively doubling network efficiency for a given power level (and therefore price point). AccelerComm operates on a B2B basis and builds software solutions based around its IP. Any business building or operating wireless to network infrastructure, client devices or related test and measurement equipment is a potential customer. The business operates a licence/royalty and software subscription business model for use of its products.

Background: FY19 a breakthrough year

AccelerComm founded in December 2016 with six employees, with Seed funding from IP Group, a listed IP investment vehicle. Bloc Ventures invested in December 2018, when AccelerComm had expanded to 18 employees. Today, AccelerComm has a team of 36 as the business starts to internationalise and expects to grow to 50+ over the next 12 months.

The year 2019 was seminal for AccelerComm in terms of bookings, customer traction, team growth and product development, leading to initial revenues of £1m and a healthy pipeline of opportunities. The company continues to pursue multiple product development growth strategies.

In March 2020, AccelerComm announced it is working closely with Intel (AccelerComm develops LDPC Decoder for Intel's FlexRAN), as well as having a strong and improving relationship with Xilinx. AccelerComm is initially finding success in enterprise private network and space applications where the performance benefits that it delivers are highly valued. This has led to recent client wins in the US, Japan and Europe.

Technology: Unique architecture

Communication systems (including but not limited to mobile) depend on channel coding (forward error correction) to ensure the data received are the same as the data sent, with transmission errors caused by noise, interference and poor signal strength. To overcome this, the transmitter adds additional information before the data is sent. Then at the receiver end, a sophisticated algorithm decodes the information to recover the original data. In mobile, 3G and 4G use Convolutional and Turbo codes, whereas 5G requires Polar and low-density parity check (LDPC) codes. Without effective channel coding, mobile networks suffer poor capacity and data rates, with reduced coverage and quality of service.

Latency issues cannot be solved by increasing capacity, with channel coding solutions a necessity. Further improvements in channel coding are becoming increasingly difficult, with channel coding already consuming c. 40% of processing load. AccelerComm’s IP is based on a differentiated application specific integrated circuit (ASIC) architecture that offers ultra-low latency, with high efficiency, with the business selling an ‘integration in a day’ solution. 4G latency is typically ~10ms+, 5G offers a reduced latency ~1ms, but this needs to be offered at speeds of 10Gbps. AccelerComm’s IP offers a scalable solution to this network bottleneck, offering reduced latency at high throughput through LDPC, polar and turbo FEC solutions.

Addressable market: One trillion connected devices globally by 2030

AccelerComm is probably the leading independent provider of channel coding technology and is building its IP portfolio to broaden the revenue base. Competitors include the large, vertically integrated network suppliers, including Ericsson, Huawei and Qualcomm, as well as contract
service providers. Large network suppliers will generally prefer to buy a market-leading solution than developing niche, highly specialist propositions themselves. 4G made the mobile internet useful but 5G it expected to make it ubiquitous with some forecasting 1 trillion connected devices by 2030. The products that AccelerComm is developing are relevant to them all.

The core management team is ex-Arm, highly familiar with the IP licensing model. As such, the company understands well the power of partnership in driving technology into multiple application domains as well as application specific consulting, customisation and support to help customers integrate their designs into their products. The company is further motivated to help customers succeed by the royalty element of a licence that is generated once products are deployed.

In the future (five years or more), AccelerComm expects to generate substantial royalty revenue; however, in the short and medium term, revenues are based around licence fees.

**COVID-19: Slowdown in business development and recruitment**

With the onset of COVID-19, AccelerComm successfully implemented a remote-working policy. However, as with all telecoms companies, the single biggest impact for them has been the cancellation of MWC-2020, which traditionally plays an important role in sales and marketing. AccelerComm has recently recruited its first full time US-based employee and is currently incorporating a US-based subsidiary from which to develop that market. Looking ahead, AccelerComm plans to continue to grow its headcount as it internationalises over the next 12 months.

**Geo-politics: China/US trade tensions, watching developments**

AccelerComm is addressing a global market, working in partnership with a number of leading hardware suppliers. AccelerComm has no manufacturing capacity and can work independently on designs with both Asian and Western partners.

**Future prospects: Series A takes to take AccelerComm to breakeven**

In FY20, AccelerComm successfully raised a [Series A fundraise](#) to fund investment in the company’s international sales capability and take the business through to break-even in 2021. Alongside Bloc Ventures (£1.5m), existing investors including IP Group invested £1m, with a new VC, IQ Capital (introduced by Bloc), contributing £3m. The round drove a 54% increase in the value of Bloc’s initial £1.5m investment.
Zeetta Networks (software defined networks, 7% of PV)

**Summary: Open, vendor-agnostic platform for software-defined networks**

Zeetta Networks offers an open networking platform NetOS, based on industry-standard hardware coupled with patented orchestration software that manages, automates and monitors networks end-to-end, while significantly reducing operating costs. NetOS is vendor agnostic. Zeetta sells NetOS to service providers and enterprises who want to drive down networking costs while improving scalability and flexibility. Zeetta also offers patent-protected extensions for virtualisation, automation and network slicing and splicing. Use cases include enterprises, smart venues, smart cities, industry 4.0, transport and logistics and events. Zeetta now has a team of over 30 employees based in its Bristol office and offshore.

**Background: Backed by IP Group and Breed Reply, working with DCMS**

In 2015, Zeetta Networks was spun out of the High-Performance Networks Group at Bristol University to commercialise the group’s network virtualisation and slicing technology and build its IP portfolio. IP Group and Breed Reply provided initial Seed funding in December 2015, before a second Seed round including Bloc Ventures in July 2017. NetOS was commercially deployed in Bristol City’s Ashton Gate Stadium until the start of the COVID-19 pandemic.

In February 2020, Zeetta was selected to lead a £9m Department of Culture, Media and Sport (DCMS) funded 5G-ENCODE project at the National Composites Centre in Bristol, which will run until March 2022. The consortium comprises ten companies including Telefonica, Siemens, Toshiba, Solvay and Baker Hughes. The project is to explore new business models and value propositions for enterprise private 5G networks in an industrial environment and test new 5G technologies such as network splicing and slicing in a real operating setting. The three use cases being tested are: interactive augmented/virtual reality; asset tracking across multiple sites and locations; and industrial system real-time operations.

In FY20, driven by the impact of COVID-19, Zeetta strengthened its indirect sales channel, targeting specialist network services resellers which has resulted in a growing opportunity pipeline. Early successes include a signed reseller agreement with Stordis. Zeetta has also selected to deploy its technology for a UK local council ‘smart city’ project.

**Technology: Visualise, Optimise and Automate**

NetOS is a patent-protected network control and management platform that provides multi-vendor, multi-technology network visibility, optimisation and automation through a user-friendly user interface. It enables network operators to virtualise their networks, automate operations and expose the network’s capabilities in a way that many competitive solutions do not, particularly in the optical layers of the network – a unique differentiator in a very sizeable market.

The core of NetOS is the capability to merge topologies from different underlying physical network technologies (eg 5G with Wi-Fi) and across different vendors to create a single aggregate topology that represents the entire network domain. The aggregate topology includes end-hosts (eg smartphones, IoT sensors, IT equipment etc) and through correlation of the network layers, NetOS can discover exactly how they are connected to the network, and monitored in real time.

Zeetta sells NetOS as three inter-related products:

- **Visualise** shows the status of all connected network devices and the associations between them. It shows how the network is configured and proposes ways of how it can be reconfigured to achieve maximum efficiency.

- **Optimise** manages connectivity in heterogeneous networks across different technologies, vendors and sites. Optimise takes an intent-based ‘service-centric’ view of the network and
orchestrates services end-to-end, across all technologies and vendors that make up the underlying physical network.

- **Automate** enables scheduling and automated implementation of new network services or groups of services on demand. It automates network configuration (70% of network downtime is caused by human error) and delivers customised connectivity to networks with regular or frequent service alterations such as those found in multi-purpose and multi-tenant venues.

### Addressable market: Targeting smart venues and Private Cellular Networks for Industry 4.0

The use case for Zeetta’s solutions is strongest where an industry has complex IT and connectivity needs. Zeetta is initially focused on two European and international sectors:

- **Smart venues**: stadiums, arenas, conference centres that host a mix of events, such as tradeshows and public events including concerts, are increasingly reliant on connectivity to manage crowds, enable retail, provide safety and enable communication. The ability to provide reliable, flexible connectivity for such venues with a complex service mix is essential.

- **Private Cellular Networks**: companies are increasingly bypassing telcos to create their own private 4G/5G networks, especially useful for industrial applications such as operating robots, tracking assets and driverless vehicles inside factories, which need fast, reliable connections that can perform critical tasks in near real time (ultra-reliable low-latency applications).

### Business model: Open network competing against closed vendor solutions

Zeetta Networks offers the leading open solution to network control and optimisation, offering greater flexibility and cost savings than a conventional software-defined network controller. Its USPs are its core network slicing and virtualisation capabilities, coupled with its flexibility and ease of use. In contrast, Zeetta’s principal competitors are broad-based IT vendors who offer some of the same functionality, but over a closed network. Competing solutions include Juniper Networks, Lumina Networks, Netcracker, Blue Planet (Ciena) and Cisco.

### COVID-19: Resilient and diversification of new business

From a commercial perspective, many of the venues/hospitality businesses Zeetta was targeting have been closed or minimally operating as a result of COVID-19 lockdowns. Zeetta’s product positioning and project pipeline improved in 2020, but revenues were delayed. The DCMS-funded 5G-ENCODE project has continued, but other commercial projects have been delayed. Zeetta is therefore focused on sales via resellers to accelerate its sales trajectory with FY21 bookings ahead of plan.

### Strategy: Focus on resellers to drive sales

NetOS is scalable, with pricing based on the number of devices directly managed by the software. Enterprise fees typically vary between £10,000-100,000 annually. The management team is focusing on a reseller/distributor strategy, working with Stordis to focus on the German enterprise market.
Pharrowtech (fixed wireless access, 7% of PV)

Summary: Fixed wireless internet for home/business broadband
Pharrowtech is a fabless semiconductor designer. It is a Seed stage start-up developing wireless RF (60GHz) sub-systems (transceiver chip, phased-array antennas) targeting the fixed wireless access (FWA) market. Delivery of ultra-fast internet (1Gbps+) to homes and businesses over the last mile is problematic, with legacy telephone copper wires or TV coax cables unable to deliver the speeds now needed and the laying of fibre too slow and expensive to roll-out universally. Pharrowtech believes that fixed wireless internet supported by its chips offers the most attractive complement to fibre globally.

Background: Radio-frequency integrated circuits technology
Pharrowtech was spun-out of IMEC, a world-renowned research and innovation laboratory, which has been working on radio-frequency integrated circuits (RFIC) since 2005. When Pharrowtech was spun out in 2018, it brought with it this RFIC experience as well as the IP and tools developed to handle analogue technology. After its separation from IMEC, Pharrowtech had a five-strong team, four of whom had previously worked at IMEC. The team has now grown to 18 and is expected to be 24-strong by the time of the funding round later in the year.

Technology: RF radio with embedded antenna array
Pharrowtech delivers a radio with an embedded antenna array, providing a low-cost and low-power consumption RFIC in bulk CMOS technology that supports IEEE 802.11ad and IEEE 802.11ay standards. The CMOS semiconductor process is proven, but IMEC had to build the design models, methodologies, and toolset to design the chips and the analogue antenna array. One of Pharrowtech’s core unique selling points (USPs) is this toolset and the company’s ability to manipulate the components to produce an optimal design solution. Demand for 1Gbps+ fibre internet access is driven by high bandwidth consuming services such as streaming (eg Netflix) and other bandwidth-hungry, low-latency applications where uptake is limited by the ability to deploy fibre to the last mile.

Addressable market: Global proposition, Europe and US led
The market for wireless networking solutions is fragmented, with many competing technologies. However, for equipment makers looking for a mmWave transceiver RFIC and an antenna design licence to incorporate in their own hardware, mm-wave phased array knowledge remains limited and Pharrowtech offers a market-leading solution. Pharrowtech’s designs work at or around 60GHz, one of the few areas where spectrum is still available globally, although not at the same frequencies country by country.

In terms of commercial roll out, Pharrowtech’s designs target the US and European markets first, with Japan and Asia next. Although initially targeting the fixed wireless access market, there are potentially multiple use cases for Pharrowtech’s designs in high-density, bandwidth hungry applications. These include virtual and mixed reality (management is in discussions with a leading platform holder), where lag and latency are a major hurdle to the adoption of the technology. Pharrowtech is exploring the use of its chip designs for autonomous transport systems with Panasonic. Other applications might occur for aircraft entertainment systems and for use in providing the connectivity in smart cities. The order and prioritisation of these opportunities will be determined by the commitment of strategic partners, with an estimated time-to-market of 18–24 months.
Business model: Hybrid model including chip sales and licence fees
Pharrowtech is a fabless semiconductor designer, working on a contract basis with Taiwan Semiconductor Manufacturing Company (TSMC) to prototype and manufacture its chip designs. The chips are ‘vanilla technology’ to be sold at US$5–10 per unit, with order sizes in the single/tens of millions for initial orders already received. Pharrowtech expects to receive a small licence fee for the antenna array.

Following prototyping, meaningful revenues expected in FY22
Pharrowtech remains pre-revenue. The first FWA prototype chip was sent for production in Q420 and, as per the timetable, is expected to be approved in FY21. It will then be made available to customers with initial orders expected to be received by the end of 2021. Initial design of the chip is underway, with a listed US technology company (that has claimed the majority of the first pre-production run) identified as a lead customer. Meaningful revenues are not expected until 2022. Subsequent additional revenue streams have an estimated time-to-market of 18–24 months.

COVID-19: Operations largely unaffected
Management implemented a work-from-home policy to address the onset of COVID-19, but Pharrowtech has experienced a slowdown in recruitment, with a number of new team members hired via Zoom and still working remotely. The cancellation of MWC-2020 has undoubtedly had an impact on business development; however, the impact has been managed with a number of meetings converted to online. Operationally, with the business in a product development phase, there was little impact on prototype chip production.

Funding: Series A strategic round targeted by H122
In terms of milestones, there are three bases on which to measure progress and development at Pharrowtech: R&D progress; commercial progress, including partnerships and order volumes; and strategic investment into Pharrowtech at an attractive valuation. Pharrowtech closed a €6.2m funding round in June 2019, and has subsequently been awarded approximately €2m in government grants, ahead of a potential strategic round in H122. However, management may consider an earlier bridge round to ensure that the company has made sufficient progress to achieve its target valuation.
Yordex (enterprise spend management, 4% of PV)

Summary: Smart spend management and flexible financial tools

Yordex has developed a suite of B2B financial software that helps decentralised businesses manage company cards, expenses, invoices and budgets with smart approval rules. Yordex targets businesses with 50+ employees and has developed a finance portal with features including budget management, invoice and cash management for spend control and low processing costs. With the backing of this software suite, Yordex provides company credit cards that offer a layer of control to the employer, allowing cards to be securely issued across the breadth of the business. They come with limitations on categories of spending as well as financial caps, but they also integrate with the company’s finance software for automated accounting, payments and expense reconciliation.

Background: Founded in 2017, credit cards launched in Q419

Yordex was founded in 2017 by former Worldpay executives Erik De Kroon and Hardeep Nagi. Bloc invested in its seed round in December 2018, investing £500k for a 16% equity stake, with a matching investment from the British Business Bank’s Future Fund co-investment programme. In 2019, management started marketing the business as a provider of ‘smart charge cards’, supported by Yordex’s software, which is cloud hosted (on AWS), fully modular and scalable. The charge card was launched in October 2019 and Yordex is signing 5–10 new clients per month.

Technology: Cloud-based, modular ‘smart order’ technology suite

To differentiate itself from its card competitors (eg Soldo, Pleo), Yordex has built its proposition on the latest technology stack, developing a modular solution that offers the client flexibility at a low price point. The technology has borrowed the smart order solution from blockchain, where every order contains its own full history. The fact that the logic resides within the data is fundamental to the flexibility of the architecture, meaning that data can be interpreted and processed accurately in multiple ways. The platform is AWS hosted and every element is scalable.

Addressable market: UK-led roll out to decentralised businesses

Yordex is targeting the UK market first and, once it has established a position in the UK market, management will consider expanding to the US and Europe. Yordex has seen particular demand from benefits-related companies (charities, universities offering bursaries, local authorities), multi-site enterprises (care homes, restaurants, and similar) as well as enterprises seeking to decentralise financial control. Clients include Transport for West Midlands, the University of Oxford, and Allied Care Homes.

Business model: Recurring licence fees and interchange fees split 50/50

Yordex derives revenues from two sources, the monthly recurring licence fee from the client as well as a share of interchange fees for card spending. Interchange fees are fairly standard, with Yordex receiving approximately 1.4% of the 1.7% interchange fee of transactions processed. Pricing starts at £3 per card per month, with client fees tending to fall between £49 and £799 per month depending on the size of the organisation, the numbers of cards issued and the depth of features used. Around six out of 10 clients signed are on the Growth plan (£199 a month) or above. Currently revenue is evenly split between the two sources. Yordex has trialled free cards (a ‘land-grab’ model more popular in the US), but its UK-client base expects to pay for such a service and tends to be put off by a free-to-use model. As Yordex has only recently issued its solution to the market, revenues are building and client stickiness is strong.
**Strategy: 80% of the flexibility, modern and easy to use**

There are three principal categories of competitor:

- Amex and the high-street banks, which offer standard cards with no controls or ‘smart features’
- The challenger banks/FinTechs, which tend to focus on the consumer first and foremost, although a number are bringing consumer features to the small business and SME market. Revolut is probably the nearest challenger proposition but the closest peers are companies such as Pleo (https://www.pleo.io/) (targeting UK SMEs) and Soldo (https://www.soldo.com/) (European target market), both VC backed. Yordex started as a procurement solution which gives it superior flexibility to these competitors, which started as consumer or small business pre-paid card providers. They typically offer off-the-shelf solutions and although they look modern, they offer little by way of client customisation. Accordingly, Yordex expects to sell at a premium to Soldo/Pleo as it offers greater flexibility and customisation to the SME, whereas Soldo and Pleo offer more standardised product solutions.
- Accounting/ERP software providers such as Xero and SAP, which provide similar workflow integration, although without the integrated credit card proposition. SAP offers a fully customisable solution but looks dated whereas Xero offers a standardised off-the-shelf SaaS solution. Yordex aims to offer 80% of the flexibility of a bespoke accountancy package, while being low cost, looking modern and easy to use for an SME, with the additional benefit of offering smart credit cards.

**COVID-19: Recently launched technology, limited impact**

Having only recently launched its smart credit card, COVID-19 impacted sales growth. However, the order book and pipeline remain full, with the team capacity constrained rather than demand constrained. Yordex is now ramping ARR to c £1m in early FY22 and growing its sales, marketing, and product teams. Headcount reached 17 at the end of 2020.

**Funding: Targeting a Series A raise in early 2022 with ARR of £1m+**

Management’s ambitions for FY20 are to add customers at current pricing, with average client size increasing. Yordex is actively looking to grow its sales team, with a full order book and adding 15–20 clients per month. Management is targeting a Series A round in 2022, but has elected to complete a smaller pre-Series-A round first, with Bloc Ventures contributing £0.5m matched by EIS investors. The funding will extend the company’s cash runway, allowing it to achieve £1m in ARR before launching a £5m Series A round. The company is in discussion with several VCs, many of whom have expressed interest in investing once the ARR milestone is reached.
Crypta Labs (quantum encryption, 4% of PV)

Summary: Post quantum computing encryption on a chip

Crypta Labs develops encryption technology and IP, using the quantum properties of light, to secure critical data and communications for the future. Crypta Labs is developing a software solution for mobile devices equipped with a camera, as a first step towards the development of a quantum random number generation (QRNG) chip-based module and IP that can be licensed to microchip architecture designers such as Arm. Focus sectors include the IoT, defence, healthcare, autonomous vehicles and mobile technologies.

Crypta Lab’s approach is to apply its quantum technology in both the pre- and post-quantum computing eras. Having solutions that can be deployed in the pre-quantum era allows Crypta Labs to generate working capital to fund its IP roadmap alongside external funding, de-risking the investment proposition in the short-term.

Background: Application use cases from defence to autonomous vehicles

Crypta Labs was founded in 2012, taking the initial idea to Government Communications Headquarters and ultimately receiving funding from Centre for Defence Enterprise. Since then, between 2016 and 2019 Crypta Labs has raised a total of US$4.4m of funding from angel investors, InnovateUK and Bloc Ventures, together with the Future Fund (source: Crunchbase).

In Q419, Crypta Labs successfully participated in two Plugtests, Cooperative Intelligent Transport Systems (C-ITS) industry events where different ecosystem participants test their solutions against defined standards. At both the ETSI Plugtest in France and the CV2X Plugtest in Spain, Crypta Labs demonstrated the effectiveness of their solution in meeting the standard’s requirements (where many other manufacturers failed).

The company is now engaged with all five vehicle testbed sites in the UK. Crypta Labs is also engaged in the EU funded Connected Roads Programme supporting O2 in the Czech Republic. Crypta Labs has developed a hardware security module (HSM) providing a secure, hardware environment for the generation and management of private and public keypairs, coupled with public key infrastructure (PKI) technology, providing software application security for the communication channels and PKI implementation from the vehicle to everything (V2X).

On other projects, Crypta Labs is partnering with a FTSE 100 infrastructure company and recently entered into negotiations for a 10-year contract to provide a 5G-based intelligent transport system security service for Midlands Future Mobility project, a new testbed being created for connected and automated mobility technology development.

The latest investment round allowed Crypta Labs to further develop its QRNG IP portfolio and to develop the first quantum-enabled HSM (QHSM), helping critical infrastructure to remain secure, as well as to accelerate the roadmap towards a single-chip QRNG.

Technology: Patent-protected IP building towards a QRNG encryption chip

In a post-quantum-computing era, algorithm-based solutions (pseudorandom RNG) can be reverse engineered and deciphered and hardware-based propositions (true RNG) can be tampered with and defeated. Hence, Crypta Labs is developing a QRNG solution to deliver true random numbers and future-proof security.

Crypta Labs’ approach allows for fast generation of random numbers, working at transmission speeds of 1Gbps, scalable to mobile phone security and other IoT applications at a price point of c 10% of competitors’ prices. In testing, Crypta Labs has passed every randomness standard.

Crypta Labs is in an R&D phase, with its first patent granted in December 2019. It has also filed for four additional patents and expects to file for a further two patents in FY21. Crypta Labs has made...
good progress on the hardware side, having created a QRNG prototype based on a Raspberry Pi 4 platform and integrated it with its hierarchical state machine module, effectively creating their first-generation QHSM product. The company now needs to miniaturise this initial prototype to create a chip-based module and IP that can be licensed to microchip architecture designers such as Arm.

Crypta Labs is developing both a hardware and software solution:

- The software solution is for mobile devices equipped with a camera. Mobile device cameras have now matured to the stage that the lens can be used to capture the random photon reception of light. Using this as the source of its encryption, Crypta Labs is developing an API and SDK to be used by app developers, with initial use cases in finance, healthcare and the IoT.

- The hardware solution is a QRNG encryption chip. A single photon is an elementary particle of light, a ‘quantum’ that acts in a totally random way and it cannot be predicted where on a receptor a photon will arrive. By combining a light source, a detector and a processor into a single ASIC chip, in combination with its software, Crypta Labs can deliver military-grade encryption for any communication device.

**Addressable market: Automotive cellular gateway market worth €0.9bn**

Crypta Labs is initially targeting the automotive and related infrastructure sector to be followed by satellite and critical infrastructure communications. From Crypta Labs’ own research, QRNG’s share of the RNG market will increase from 15% in 2019 to 50% in 2022. Crypta Labs is one of c 200 lab-based QRNG solutions. Management expects the encryption segment of the cybersecurity market to be worth c €14.6bn in 2024, with a TAM for RNG of €12.7bn and a SAM for critical cellular gateways of €7.8bn. Management estimates the automotive segment of the cellular gateway sector to be worth €0.9bn.

**Business model: IP licence fees plus unit-based royalties**

Crypta Labs envisages an IP licensing model where the TopCo owns the IP, with a series of sector-focused subsidiaries responsible for business development and sales. As the product proposition matures in a given sector, the subsidiary may be sold with royalties continuing to be received by the group. Focusing on the automotive sector, Crypta Labs is developing a chip-based solution that can be delivered at a relatively low cost (c €100 per unit) while allowing transmission speeds of 1Gbps and above. The company has engaged in extensive testing with UK-based car platforms as well as working with O2 for the CITS trial in the Czech Republic. Other sectors (eg aerospace, satellite, IoT, critical infrastructure) are expected to follow.

**COVID-19: Project delays affecting cash runway**

The lack of customer traction in terms of proof-of-concept validation in 2020 is disappointing, although arguably COVID-19 similarly impacted all C-ITS project work across the UK and Europe. Progress for the C-ITS trial in the Czech Republic, as well as for other projects, is likely to be slow until travel restrictions ease. Management is prudently managing cash reserves to extend the cash runway.

**Funding: Pre-Series A bridge round until revenues achieved**

Crypta Labs is seeking to raise a bridge round in FY21 to offset lost revenues, which Bloc Ventures will support if a lead investor can be identified. In an upside scenario, this would then lead on to a Series A funding round once initial revenues are achieved (not before 2022). Otherwise, as the only preference shareholder in the business, Bloc’s position is secured against the company’s IP portfolio.
EVRYTHNG (IoT, 3% of PV)

Summary: A digital identity provider for branded products

EVRYTHNG is a cloud-based IoT business intelligence company. The EVRYTHNG Product Cloud platform allows consumer goods companies to gather and apply traceability data for product items end-to-end, from factory to consumer. Brand owners and manufacturers use this data to optimise inventory, combat fraud and illicit trade and to connect with and gather consumer engagement data. The technology is becoming increasingly useful to provide an audit and analytics trail as regulation and ESG measurement requirements increase globally.

Background: Series B extension to take company to break-even in H221

EVRYTHNG was launched in 2012, completed its Series A raise in April 2014 and a Series B in February 2017. The company had raised over US$60m at the completion of its most recent US$10m funding round in October 2020. Investors include Sway Ventures, BHLP, Generation Ventures, Dawn Capital, Atomico, IDC Ventures and Cisco among others. Bloc Ventures made its initial investment in January 2017 and owns 2% of the equity. The company expects to break-even in H221.

Technology: A land grab for global product data management

EVRYTHNG is part of a US$15bn+ consumer insights and supply chain intelligence market, with some four trillion products sold every year by over two million manufacturers. The company has developed a strong presence in the premium apparel sector, accounting for c.10% of the market opportunity value of US$1.5bn. With end-user demand in apparel hit hard by COVID-19 in 2020, EVRYTHNG focused on expanding its other verticals, including beauty, packaged goods and food & beverages. There is quite a high level of market concentration, with 60% of consumer product sales originating from 300 brand owners in Europe and the US. By way of example, Ralph Lauren manufactures c.180m products annually across 130 different factories. EVRYTHNG derives c. US$1.2m of ARR through a five-year contract, generating 80% gross margins.

COVID-19: Resilient performance, diversification across sectors

EVRYTHNG has a long-term digital recurring revenue model so revenues remained robust and even grew in FY20, with the company continuing to close contracts in FY20 and H121 despite COVID-19. Management shifted focus, extending customer acquisition from apparel to packaged goods, food & beverage, and beauty. Contract wins in H220 highlighted the diversity of the business, including long-term contracts with Levi Strauss (apparel), Reckitt Benkiser (healthcare), Hewlett Packard (technology), MOWI (fresh seafood), ABInBev (beverages) and PUMA (apparel). Apparel began to demonstrate recovery in Q121. Recurring revenues from packaged goods and food & beverages are 50% of the company’s run rate at Q221.

Business model: Platform built, pushing to scale

EVRYTHNG has built a cloud-based platform-as-a-service model, based on open-standards technology (so clients are not locked in), which it is now starting to commercialise. Every new client incrementally adds to that recurring revenue base, paying a fee per product item per year (US$5-10 per 1,000 items). Pricing varies depending on the product price point and committed volumes. QR codes, tags and labels are placed on products by packaging companies, with the data managed by the EVRYTHNG Product Cloud with Google Cloud, Alibaba and AWS. EVRYTHNG provides a suite of application solutions operating on the EVRYTHNG Product Cloud.
Strategy: Limited competition for a deep tech niche

Although the technology is sector agnostic, management refocused the business toward sectors other than apparel in FY20, targeting the packaged goods, food & beverage, and beauty sectors. Management recognises that potential competitors include large, capable, well-funded global groups (eg IBM), but believes that these groups will perceive the market as too niche to warrant direct investment, preferring instead to buy existing market solutions once they are market-proven.

Management looks at five categories of competitor: 1) tag/label & packaging providers (eg TetraPak); 2) serialisation providers (eg Systech, Antares Vision); 3) traceability compliance providers (eg Kezzler, PSQR); 4) supply chain data providers (eg project44, EverStream); and 5) systems integrators who are likely to consider an acquisition over developing their own proposition (eg CapGemini).

Although competitors overlap certain elements of the business, management does not yet see a core competitor trying to replicate what EVRYTHNG is seeking to achieve and sees EVRYTHNG’s end-to-end, item-level data management approach as highly differentiated. Given the time and investment taken to develop EVRYTHNG, the temptation for a larger players is likely to be to buy a defensible, niche technology, rather than to seek to build a direct competitor.

Funding: Growth equity and M&A

EVRYTHNG is targeting breakeven by H221 in its organic business plan. With demand for digital identity and traceability accelerating, the company is planning to raise growth equity during H221 to support M&A and accelerate the platform’s roll out. M&A targets are likely to include consumer engagement and authentication solutions and targets in specific verticals and geographies. Acquisitions will increase the ARR run-rate, accelerate the product roadmap, and bring new relationships and customers to EVRYTHNG’s platform.
Paytia (cloud-based payment compliance software, 3% of PV)

Summary: A secure cloud-based telephone payment solution

90% of businesses that take card payments over the phone ask customers to read their card details aloud. Put simply, it is a rule breach if merchants take a credit card number from a consumer by jotting down the number. Paytia offers a cloud-based platform that enables customers (often SMEs) to take telephone credit card payments without breaching PCI (payment card industry) security rules, or GDPR. Card acquirers (banks offering card acceptance services to merchants) and card schemes penalise merchants with higher fees if they do not have a compliant process for receiving telephone payments. Paytia provides such a solution.

Background: Bloc's investment drives commercial roll-out

Paytia was established in 2016 as a spin-off from a secure voice recording company financed by Vodafone. Its CEO, Curtis Nash, is a serial entrepreneur in telecoms and payments applications who previously founded Cognia, a global communications services company for compliance, risk and productivity, later acquired by Smarch, a US technology company. Paytia was self-funded prior to its seed round in September 2020, when it raised £1m led by Bloc Ventures. The investment has enabled Paytia to significantly scale its commercial and technical teams. Paytia currently employs 14 staff, with a UK-based central team of five staff, together with a development team of nine people based in India.

Technology: cloud-native card not present (CNP) global payment solution

Paytia offers a cloud-native platform (hosted on AWS) that can scale globally, providing businesses with a scalable and affordable means to take card not present (CNP) payments from customers in full compliance with PCI-DSS standards and without breaching increasingly onerous payment and identity regulations. Paytia’s solution is PCI DSS Level 1 certified, a US compliance certification that typically takes at least 3 years to secure. Its technology allows sales staff to take payments over the phone in compliance with regulation, reducing the risk of fraud and fines for non-compliance.

Paytia operates in the UK, India and the USA, providing a link between payment services companies (including partners such as Stripe, aircall, PayPal and worldpay) and telcos, who are offered a share of Paytia’s revenues.

Paytia offers four products:

- **Secure Virtual Terminal**: enables card payments to be made during customer calls without customers having to disclose their payment card details.

- **Automated Payments**: an automated solution that enables customers to make card payments over the phone, without the need for a member of staff to be on the call.

- **Keyphone**: allows payments to be taken securely during customer calls (by dialling 729), without the need for any hardware or a computer. Importantly, the solution does not require a smartphone.

- **API**: enables contact centres, software vendors, and telcos and payments services providers to seamlessly embed Paytia’s Secure Virtual Terminal functionality into their core applications to allow secure payment-handling.

Paytia’s solutions can be used on a stand-alone basis or as an integrated add-on to a range of telecoms partners. Whilst leading competitors can take months to deploy an on-premise solution, Paytia is able to deliver its cloud-based solution in less than an hour.
Addressable market: US$750bn in the US alone

Growth in remote commerce has led to a resurgence in voice-based payments, with card transactions estimated to be worth US$750bn in the US alone. As well as the US and the UK, Paytia is also focusing on the opportunity in India, a mobile-enabled market of 42.5m SMEs, although many do not have smartphones.

Business model: cloud-based SaaS model

Paytia’s platform is given to telecoms companies for free, incentivising them to provide access with a cut of the revenues from card transactions completed over their networks as a cloud-based SaaS model. Paytia’s revenue model involves charging the customer a set-up fee and a percentage transaction fee, as well as a monthly subscription fee. Competitors include Eckoh plc (LSE: ECK), PCI Pal (LSE: PCIP) and Semafone, a PE-backed private company.

COVID-19: strengthened Paytia’s use-case and accelerated its roll-out

Along with other companies operating SaaS based revenue models, the COVID-19 pandemic has driven take-up of Paytia’s solutions as well as driving increasing volumes of CNP transactions. With a number of its principal competitors only providing on-premise solutions, the pandemic strengthened Paytia’s use-case and accelerated its roll-out.

Future prospects: Series A round in next 12 months

Paytia was pre-revenue when Bloc invested in September 2020, but following Bloc’s investment has subsequently exceeded early revenue expectations, with £6.5m of transactions completed to date. The priorities following the funding round were to launch its products, to sign-up major customers and prove the channel strategy. The company has secured initial trials with a solid pipeline of direct customers and is working with channel partners including a number of major global online payments companies. The company hopes to raise Series A funding in the next 12 months, based on strong growth in ARR. The Series A funding will allow Paytia to scale-up, increase its range of channel partners and support further international expansion.

Bloc value-add: network connectivity and mobile expertise

Paytia’s CEO, Curtis Nash, had known David Leftley from Bloc Ventures for over 10 years, with a personal history going back to David’s role at Vodafone Corporate Ventures. Given this history, Bloc’s evident mobile expertise and network of channel partners, a decision to take funding from Bloc Ventures was the obvious path.

Exit prospects: exit not yet on the radar

Although Paytia is very early in its lifecycle, we would note that Curtis Nash, as a serial entrepreneur, has previously sold a number of businesses to strategic acquirors.
Mindtrace (artificial intelligence, 3% of PV)

Summary: Neuromorphic artificial intelligence (AI)

Mindtrace is one of few companies worldwide developing intelligent machines capable of ‘unsupervised learning’, which is regarded as the next step in the development of AI. Mindtrace is deploying AI capabilities closer to human level intelligence (‘AI Brains’) through the use of unlabelled data, unsupervised few-shot learning, knowledge consolidation and sharing. Mindtrace’s AI solutions enable customers and partners to reduce costs (the biggest cost component of most AI applications in the market today is training the AI) as well as enhance customers’ end-products and services – delivering continuous AI learning of new use cases from unlabelled data using only a few reference examples, and transfers this learnt knowledge across multiple devices. The resulting AI technology can be applied to multiple applications where visual image processing is required, with potential applications including data management, cyber security and the internet of things, however the initial focus is on systems for autonomous vehicles.

Background: Manchester University spin-out, funded by Bloc in Q121

The core concepts that underpin Mindtrace were conceived in 2015 and the business received its first institutional capital investment in 2017 (Mercia, ADV). The current CEO, a successful serial entrepreneur, was appointed in Q419. Bloc invested £1.0m as part of a £2.4m Seed+ round in H121, led by Skylake Capital, with participation from Bloc Ventures and existing investor Mercia Asset Management. Management is targeting a Series A funding round in 2022 if milestones are met. Sir Hossein Yassaie, the former CEO of Imagination Technologies and a serial investor in disruptive technologies, was appointed chairman in 2017, with Professor Steve Furber, the ICL Professor of Computer Engineering at the University of Manchester, also on the board.

Technology: cloud-based, adaptive AI suited to edge learning

Mindtrace has developed a cloud-based (supported by AWS) artificial intelligence software platform, Brain Sense, that enables computers to learn without repetitive instruction, digitising part of a human’s cognitive processing flow. Mindtrace identifies three challenges for enterprises: 1) leveraging the use of unlabelled data to support training of the AI; 2) unsupervised future learning based on the limited datasets available in many scenarios; and 3) static capabilities - adding new scenarios often causes trained AI to lose its learning, however Mindtrace’s IP allows scenarios to be added incrementally with loss of historic learning. The strength of its IP allows Mindtrace to operate successfully based on a 90% reduction in manually labelled data. This can lead to a roll-out time up to 6x shorter than competitors. When new scenarios are added to a dataset, the AI does not need to retrained on the whole dataset. This allows continuous edge learning, with new data capable of being added incrementally as and when data becomes available. Mindtrace’s technology enables a set of new possibilities that minimizes the need for big data and allows for faster learning and more intelligent AI that adapts to changing real life conditions.

Addressable market: initial US$5-20bn market opportunity

Mindtrace is building a commercial pipeline based on its research, both since the company was founded in 2015, as well as on prior research at Manchester University before the company was spun-out. What differentiates Mindtrace is its neuromorphic specific hardware configuration, with a “plug and play” technology that can be integrated with existing customer technologies. The technology uses unlabelled data and can “interpret” that data to apply it to different scenarios.

Management has identified four priority sectors and selected three of these for initial commercial roll-out. The three priority sectors are: Asset/fault inspection; smart devices/IOT; and autonomous vehicles. The fourth segment was mobile, however this segment has been put on hold due to the current political climate, particularly with regards Huawei where the CEO has strong connections.
Funding from the latest investment round in Q121 has supported the company’s transition from research to implementation, with the initial commercial roll-out of Mindtrace’s AI commencing in Q221.

Management’s priority for 2021 is to validate Brain Sense within key market verticals, including: retail analytics (fraud detection), asset/utility inspection (power lines) and gait analysis (i.e. human movement). These use cases are all heavily reliant on human supervision and represent a combined market value of US$5-20bn.

**Business model: Pre-revenue, working closely with strategic partners**

The business is largely pre-revenue, with Bloc’s initial investment coming in January 2021. Bloc’s investment was made to support commercial roll-out as the COVID-19 pandemic starts to recede and restrictions begin to ease, with early sales engagement starting in May 2021. Management envisages signing multi-million pound long-term year contracts with a relatively small number of global clients.

**COVID-19: Bloc’s investment to accelerate Mindtrace out of COVID-19**

As Mindtrace transitioned from its initial research phase, with commercial sales only starting in Q221 following the close of its Seed+ round, the business was largely insulated from the impact of the COVID-19 pandemic.

**Future prospects: Aiming for £1bn+ ARR in the medium-term**

In FY21, Mindtrace is looking to sign a small number of deals with strategic leads, delivering low levels of initial revenues primarily from consultancy. Off the back of these initial contracts, the company anticipates a US$7-10m Series A funding round in FY22 (either in the US or UK) to accelerate commercial roll-out, with the number of clients doubling in FY22 and delivering the first material annual recurring revenues (ARR). Thereafter, the company envisages continued growth towards its target of £1bn+ of SaaS revenue in the medium-term.

**Bloc value-add: Track record, network and specialist expertise**

There were two principal factors that attracted Mindtrace to Bloc Ventures. Mindtrace was already part of Bloc’s network, having an established relationship of trust with Mike Dimelow, through his former role with ADV, which had previously invested in Mindtrace. Mindtrace’s management team was also highly impressed with Bloc’s CIO, David Leftley, who is seen as a visionary, almost better able to articulate their value proposition than Mindtrace itself.

**Exit prospects: Too early to be specific**

At this early-stage in its lifecycle, Mindtrace is focused on growing the business, and believes that exit opportunities will present themselves as the technology is proven and revenues scale.
Tether Technology (cloud video security, 3% of PV)

Summary: Hybrid-edge and cloud-based CCTV platform

Tether is a UK-based company that operates a cloud platform offering CCTV backup and number plate recognition, with functionality being expanded into device health and integration with third-party services such as alarm monitoring and AV analytics, on a revenue-share model. To detect the cameras, aggregate the video and provide a secure communication route to the Cloud, Tether provides a range of three “Tetherbox” hardware platforms as well as a software only product that can be integrated into other platforms. The ultimate aim is to provide the security application platform (SAP) platform software to integrators who will load it onto third party hardware.

Background: Partnership-based expansion

Tether was founded in 2009 and has attracted customers drawn from sectors including retail, finance, housing, education, construction and healthcare among others. Bloc invested in the company as it launched the Tether X platform in November 2017. Since Bloc’s investment, the company has focused on becoming a volume operator, with the majority of Tether’s products delivered through a distribution partner, Mayflex. Tether has also established a tiered partner program with seven gold, five silver, and two OEM channel partners (security installers). The company is looking to build up new partnerships in 2021 to increase distribution across the UK.

The team now totals 13 FTE including a managing director based at Tether’s operations base in Devon, as well as the London HQ.

Technology: Video surveillance-as-a-service (VSaaS)

The Tether platform brings physical security devices into a single visual dashboard, with legacy video cameras, alarms and other surveillance equipment aggregated to the cloud via a secure gateway. The Tetherbox connects to new and established hardware, as well as most legacy physical security equipment. Tether’s platform has been built on many years of software development and is now established in the market, with both UK and international client references.

Tether’s security applications platform allows the client to monitor surveillance equipment on site or remotely, providing notification of potential issues, responding to alarm events and finding critical evidence, as well as producing reports for compliance and audit tracking purposes.

From a client’s perspective, Tetherbox provides ease of access to video recordings, collecting information from all cameras, switches, NVR/DVRs on the system and securely displaying the information on a single dashboard. The system monitors the health of the CCTV system, with remote diagnosis and fault detection and, with recordings backed-up to the cloud, the system enhances the overall security of the client’s network. The remote management typically helps reduce engineer call-outs by at least 40%. The platform is scalable, with new hardware able to be added to the existing network, and reliable, with 99.98% uptime in 2020.

Addressable market: CAGR of 16%, US$5bn VSaaS market in 2025

According to mmreports, the video surveillance market globally was approximately a US$43bn market in 2019, growing at a CAGR of 14.6% to 2027, with video surveillance SaaS market CAGR of 16% 2020-25, growing from US$2.2bn in 2020 to US$4.7bn in 2025.

The market is still dominated by traditional (off-line) legacy systems, served by a series of local and regional surveillance hardware suppliers. Existing market participants tend to be geographically limited but are increasingly offering cloud-based solutions. Tether has developed substantial IP in its product-set, and management estimates that it would take a new competitor 3-5 years to develop a comparable platform, together with a further two years to establish appropriate client references.
Business model: SaaS-led recurring revenue model

Tether has used its existing installed base and routes to market to leverage market share in video cloud storage and analytics, and then upsold its platform to increase both direct and indirect sales. The company charges a one-off activation fee for its hardware and installation, but the majority of its fees come from recurring SaaS revenues, with a revenue share for its distribution partner, Mayflex.

Prices vary significantly depending on customer requirements, with some customers only requiring a 10 day record of video recordings, whilst others require up to six years. Certain customers only need time-lapse recordings, whilst others need 4k video. All footage is stored on European servers, with UK storage as a further option for eg the NHS. Future functionality (eg device health, alarm monitoring and AV analytics) is expected to be charged on a revenue-share model.

COVID-19: Tether’s remote solution benefited from lockdown

As a cloud-based service, COVID-19 underlined the need for SaaS solutions such as Tether’s. Tether’s gateway can be ordered and delivered by Mayflex, and then set-up by one of Tether’s remote engineers without the need to visit the client’s premises. Once set-up, surveillance information is uploaded to the cloud where equipment and video output can be monitored, searched and administered remotely with automated fault-checking minimising the need for on-site engineer call-outs.
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