

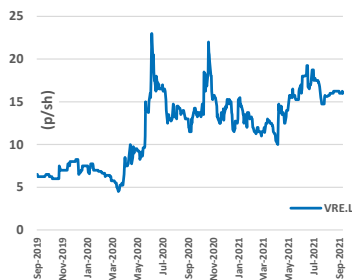
14<sup>th</sup> September 2021

### Sector: Software

Specialised Virtual Reality (VR) communications platform company.

### Market data

Ticker	VRE/6VR
Price (p/sh)	16.25
12m High (p/sh)	10
12m Low (p/sh)	22
Shares (m)	290.1
Shares FD (m)	290.1
Mkt Cap (£m)	47.1
Market	AIM/XESM



Source: IRESS

### Description

VR Education is a leading virtual reality ('VR') technology company, focused on becoming the world's largest crossed reality ('XR') communications, training and virtual events platform provider, through commercialisation of ENGAGE, its proprietary online virtual platform.

[www.vreducationholdings.com](http://www.vreducationholdings.com)

### Board & key management

Chairman	Richard Cooper
CEO	David Whelan
COO	Sandra Whelan
CFO	Séamus Larrisey

### Corporate Broking

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## VR Education Holdings

### *Delivering real progress in Virtual Reality*

Upon publication of VRE's interim results, we use this note to re-visit the investment case for VRE, together with a re-initiation of forecasts. Confirming the positive newsflow on client gains and sales growth over the H1 period, VRE posted an 83% increase in turnover to €1.25, with ENGAGE revenues 50% up on the total achieved in 2020. Our forecasts show a three-year turnover compound average growth rate (CAGR) of 91% to €9.8m in 2023E, in line with the objective to reach €10m of ENGAGE revenues between 2023 and 2025.

► **Important H1 developments:** The first half of 2021E has been a busy period in terms of developments and announcements from VRE. Alongside its January trading update, the group released details of its Medium-Term Outlook plan, including financial targets and the metric dynamics to attain these targets, including client user numbers (+10% month on month), a CAGR rate of annual ENGAGE revenue of more than 100%, a retention rate of 80% and growth in the average annual contract value to €20,000+. Subsequent trading updates have confirmed the strong rate of progress in ENGAGE revenues, with VRE also passing the milestone of its 100<sup>th</sup> client win. Its strategic trading partner, HTC, made two announcements, which should provide considerable impetus to the roll-out of the ENGAGE platform, sold in China under the VIVE Sessions brand. First, HTC announced the inclusion of VIVE Sessions in the software bundle for its new headset, VIVE Focus 3 XR. Second, HTC announced a partnership agreement with HP, whereby HP is to roll out VIVE Sessions on new HP ProBook laptops sold within China. In June, VRE made two announcements of significant importance to the group's longer-term progress. An oversubscribed €9m gross equity placing secures the medium-term financial position, enabling significant investments in both human resources, notably within sales and marketing (though across all functions), and marketing activities. Accompanying the placing, VRE announced the next evolution to its ENGAGE platform – the launch in 2022 of a fully-featured corporate metaverse, code-named ENGAGE Oasis.

► **Interim results:** Revenue increased by 83% over last year to €1.25m and was accompanied by a strong uplift in gross margin to 79.5%, reflecting the increased mix participation of the ENGAGE platform's revenue stream. ENGAGE revenues were up just over 300% year-on-year. The gross profit contribution more than doubled to just under €1.0m. Losses at both EBITDA and operating levels saw small increases, though EBITDA and operating margins registered considerable progress, with the increase in operating costs being outstripped substantially by the rise in turnover. The EPS loss saw a marginal improvement, though this does not reflect the full dilutive impact of the June equity placing. Net cash stood at €9.2m at the period end, compared with €3.2m at the H1 period end last year (and €2.0m at the FY20 year-end).

► **Re-initiation of forecasts:** We have assumed a CAGR growth rate of just under 150% over our three-year forecast horizon for ENGAGE revenues, reflecting some incremental benefit of the ENGAGE Oasis launch. ENGAGE revenues are forecast to reach €9.3m in 2023E, with total group revenues just shy of €10m. Gross margins rise over our forecast horizon to 86%. While we forecast increasing losses in 2021E and 2022E, the benefits of achieving critical mass in 2023E sees a significant reduction in EBITDA and operating losses. While not explicit in our 2023E figures, our forecasts imply that VRE will move into an EBITDA positive trading position in H2 2023E.

► **Investment case:** Virtual Reality (VR) technology is benefitting from increasing levels of both consumer and commercial take-up, aided by several factors that have combined to form a powerful tailwind to future prospects. In turn VRE's developments and trade partnerships have strengthened its position and potential within the VR market. With few directly comparable listed peers, VRE offers a differentiated and unique investment opportunity within the technology sector, and more specifically within the high growth Extended Reality (XR) subsector.

# Table of Contents

<b>Executive Summary .....</b>	<b>3</b>
Investment case .....	3
<b>Introducing VR Education Holdings .....</b>	<b>5</b>
<b>Market Backdrop and Outlook .....</b>	<b>10</b>
Virtual Reality (VR) .....	10
VR applications .....	11
Market penetration and growth forecasts .....	12
<b>Strategy and key objective... ..</b>	<b>17</b>
....to ENGAGE the world .....	17
Recent news flow .....	17
Medium-term outlook .....	18
Equity raise .....	18
ENGAGE Oasis .....	19
Interim results .....	21
<b>Forecasts .....</b>	<b>23</b>
<b>Valuation .....</b>	<b>25</b>
<b>Risks .....</b>	<b>27</b>
<b>Board of Directors .....</b>	<b>29</b>
<b>Major shareholders .....</b>	<b>30</b>
<b>Glossary .....</b>	<b>31</b>
<b>Summary financials .....</b>	<b>32</b>
<b>Disclaimer .....</b>	<b>34</b>

# Executive Summary

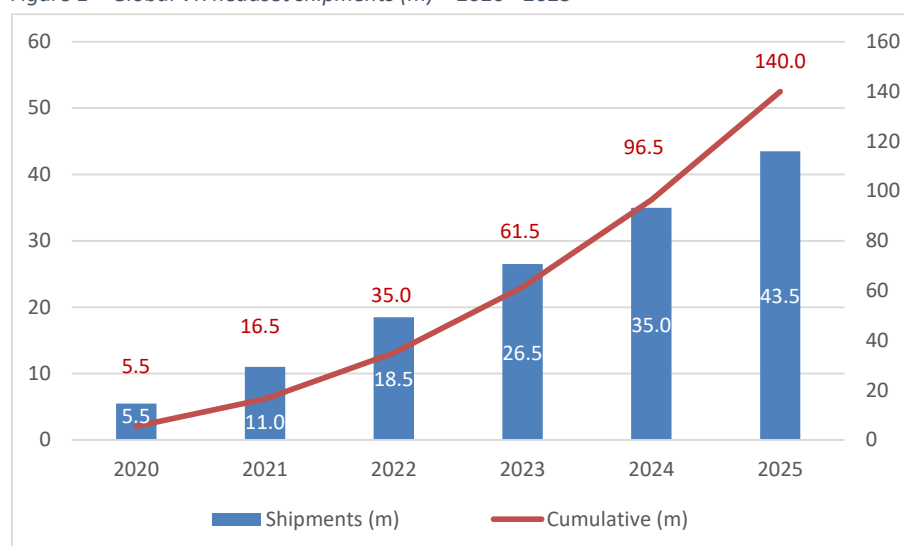
## Investment case

**VRE is a specialist Virtual Reality (VR) company.....**

**.....in an industry with strong growth prospects**

- Founded in 2014 by David and Sandra Whelan, VRE is an early adopter company within the emerging technology of Virtual Reality (VR). This technology is benefitting from rising levels of both consumer and commercial take-up, aided by several factors that have combined to form a powerful tailwind to future prospects.
- These prospects are borne out by industry forecasts for global VR headset shipments over the medium-term, as can be seen in the following chart.

Figure 1 – Global VR headset shipments (m) – 2020 - 2025



Source: Statista

**Tailwind generated by several supporting factors**

- The supporting factors for the high growth forecasts for VR and associated technologies in general and VRE more specifically include:
  1. **The Covid-19 pandemic is set to drive fundamental longer-term changes** to how people work, study and travel, favouring remote working with more immersive communication, conferencing, learning and events platforms.
  2. **Technology advances have supported the growth of VR**, most notably the advent of affordable standalone headsets that do not require tethering to a desktop PC. In addition, the roll-out of the faster 5G network will support a greater range of applications.
  3. **VRE continues to benefit from first mover advantage** given its early adoption of and pure focus on VR technology
  4. With the Asia-Pacific (ASPAC) region seen as a key regional driver of global VR growth over the next decade, **VRE's partnership deal with HTC gives unparalleled access to the Chinese market.**
  5. The **€9m equity placing in June 2021 means VRE is well-funded** to develop and grow its business over the medium-term.

## VR Education Holdings

**Clearly segmented and branded service offering through its proprietary VR platform - ENGAGE**

- ▶ Within its proprietary VR platform, ENGAGE, the company has three clearly segmented and targeted service offerings, addressing its three main user groups, namely enterprise, education and events clients. VRE estimates that the size of its total addressable market (TAM) globally in these three areas is \$10bn – \$25bn. Its three core sub-brands under the overall ENGAGE umbrella are:
  - **ENGAGE Virtual Campus** – for education clients, enabling remote classes offering persistent virtual campus/educational locations and private branded learning environments.
  - **ENGAGE Virtual Office** – for enterprise clients, facilitating remote team collaboration and meetings offering persistent virtual office locations and private branded office environments.
  - **ENGAGE Virtual Events** – for event clients, enabling the hosting of large-scale virtual events in a safe environment with large cost savings over traditional events, offering a wide range of unique content possibilities.

**Recent launch announcement of ENGAGE Oasis metaverse**

- ▶ Alongside the June equity placing, VRE announced the next evolution of the ENGAGE platform, to be launched next year. **ENGAGE Oasis** is a metaverse designed for business professionals, corporations, young professionals and college students seeking to provide professional services, sales and professional events in an immersive environment. The aspiration is for it to become the LinkedIn of the metaverse.

**Target of €10m ENGAGE revenues by 2023 - 2025**

- ▶ VRE outlined its key medium-term financial and commercial objectives for the 2023 - 2025 period alongside its January 2021 trading update. The headline targets are to reach ENGAGE revenues of €10m through a client base of 500 active enterprise customers, with 100,000 monthly users within the 2023 – 2025 period.

**Our re-initiated forecasts show 3-year turnover CAGR of 91% to €9.8m in 2023E**

- ▶ We re-initiate our forecasts for VRE in this note. These show the group delivering a three-year revenue CAGR of 91% to €9.8m in 2023E, moving to a positive EBITDA position in H2 2023E. The key headline figures are shown below.

Figure 1 – Headline forecast summary – 2021E – 2023E

	2019	2020	2021E	2022E	2023E	3-yr CAGR
<b>Turnover</b>	<b>1.025</b>	<b>1.417</b>	<b>2.485</b>	<b>4.879</b>	<b>9.842</b>	<b>90.8%</b>
Gross profit	0.623	1.013	1.916	4.053	8.473	103.0%
Gross margin (%)	60.8%	71.5%	77.1%	83.1%	86.1%	
<b>EBITDA</b>	<b>(1.438)</b>	<b>(2.067)</b>	<b>(2.819)</b>	<b>(3.795)</b>	<b>(0.435)</b>	<b>(40.5%)</b>
EBITDA margin (%)	-140.4%	-145.9%	-113.4%	-77.8%	-4.4%	
<b>Operating profit</b>	<b>(1.932)</b>	<b>(2.721)</b>	<b>(3.428)</b>	<b>(4.242)</b>	<b>(0.483)</b>	<b>-43.8%</b>
Operating margin (%)	-188.6%	-192.1%	-137.9%	-86.9%	-4.9%	
<b>Pre-exceptional pre-tax loss</b>	<b>(1.939)</b>	<b>(2.728)</b>	<b>(3.428)</b>	<b>(4.242)</b>	<b>(0.483)</b>	<b>(43.8%)</b>
<b>Pre-exceptional EPS (€)</b>	<b>(0.010)</b>	<b>(0.011)</b>	<b>(0.013)</b>	<b>(0.015)</b>	<b>(0.002)</b>	<b>(47.2%)</b>
<b>Net cash/(debt)</b>	<b>1.293</b>	<b>2.033</b>	<b>7.624</b>	<b>3.550</b>	<b>2.748</b>	<b>10.6%</b>

Source: VRE, Shard Capital

**Few directly comparable listed peers**

- ▶ The lack of directly comparable listed peers makes comparative valuation (compc) analysis difficult, compounded by comparisons being limited to the EV/sales metric. VRE's EV/sales rating is above both the average and median of our selected compco cohort in 2021E and 2022E, but reverts to norm in 2023E, reflecting its high CAGR turnover growth. Against the best-in-class comparator (Kahoot), VRE stands on around a 50% discount, averaged over the three-year forecast horizon.

**VRE offers a differentiated and unique investment opportunity within the technology sector**

- ▶ With few directly comparable listed peers, **VRE offers a differentiated and unique investment opportunity within the technology sector**, and more specifically within the Extended Reality (XR) subsector - comprising Augmented Reality (AR) and Mixed Reality (MR) as well as VR - and its highly attractive growth outlook.

## Introducing VR Education Holdings

### ***Founded in 2014***

Immersive VR Education (IVRE) was founded by David and Sandra Whelan and incorporated in Ireland in October 2014. Its primary goal was to transform the delivery method of digital education and corporate training through the utilisation of Virtual Reality technology.

### ***Listed in 2018***

The Group currently has a workforce of 60+ working between its Waterford, Ireland office and remotely across Europe and USA. The Group came to the market in 2018 as VR Education Holdings (VRE), the holding company of the Group. This was via an Initial Public Offering (IPO) at a share price of 10p, raising gross new money proceeds of £6m for the Group. VRE is traded on AIM in London and dual-listed on the Euronext Growth Market of the Irish stock exchange in Dublin. VRE continues to use the Immersive VR Education brand of its operating company for marketing purposes for continuity reasons. In this document we reference VRE to cover both the holding company/group and the trading entity.

### ***VRE's central focus is the development, promotion, and adoption of its proprietary VR learning platform - ENGAGE***

VRE's central focus is the development, promotion, and adoption of its proprietary VR learning platform - ENGAGE. The ENGAGE platform was released as a public Alpha version in 2015 and a more fully featured development version in 2016. Significant updates to the ENGAGE platform were delivered in 2018 ahead of its full commercial release in December 2018. These updates included an updated avatar system, the creation of user accounts and the integration of a payments system. The ENGAGE platform enables students and educators to attend lessons remotely in a virtual reality environment. It also allows corporate training sessions and meetings to be conducted remotely, as well as enabling educators and corporate trainers to create their own VR content for publication within the platform. The Group has termed this learning method Online Virtual Attended Learning (OVAL).

### ***Showcase Experiences such as Apollo 11 generated revenue and raised awareness of VR and ENGAGE.....***

As said previously, VRE's primary goal is to achieve wide scale adoption and monetisation of its ENGAGE platform. While ENGAGE was being developed and ahead of its commercial release, VRE pursued a different yet complementary path, which generated revenue, allowed the Group to build its virtual asset base and served to raise awareness of and interest in VR and ENGAGE. This was achieved through the development of a series of so-called Showcase Experiences. These underpinned VRE's position as a leader in the creation of educational content, while also showcasing to the market the potential for VR within the education sector. These Showcase Experiences include:

- Apollo 11 VR (released April 2016)
- Titanic VR (early access version released November 2017)
- 1943 Berlin Blitz (released in partnership with the BBC in October 2018)
- Shuttle Commander (released December 2019)

### ***.....winning many industry awards***

There have been several enhancements and iterations of both the Apollo 11 and Titanic VR experiences, with both nominated for and winning several awards. Apollo 11 VR's awards include the Time Warner Future of StoryTelling award, the VR Fest Best VR Animated Education Films, Fivars Public Choice award, among others. In November 2018, Berlin Blitz won in the Best Interactive Experience category at the Royal Television Society awards. VRE's Showcase Experiences have performed strongly with Apollo 11, Titanic and Space Commander generating over €3m since their respective launches. The majority of this relates to Apollo 11, which has generated over €2m since its launch in 2016.

## VR Education Holdings

### *Collaboration with academic institutions to deliver VR learning and training content*

The Group has also actively engaged with leading academic and medical institutions, including Oxford University and the Royal College of Surgeons in Ireland (RCSI), to produce lectures and training content on the ENGAGE platform. It has also worked in collaboration with educators from Stanford University, University of Arizona, Tokyo Global Gateway and other institutions.

Up until its IPO and the new money raise, the Group had been funded through equity investments, redeemable preference shares and convertible loan notes. The Group raised €300k of seed funding in 2016 and €950k in 2017. Investors in the venture were Enterprise Ireland, Kernel Investments and Suir Valley Ventures. Suir Valley Ventures is a related company to Shard Capital, which acted as joint broker to VR Education Holdings for its IPO. The IPO monies were deployed primarily in the development of the ENGAGE platform, though VRE has continued to see negative free cash flows as it invests to grow the business through monetisation of increasing uptake of the ENGAGE platform.

Since its IPO, VRE has entered into a growing number of commercial agreements and partnerships with a wide range of partners, all of whom share a common belief in the benefits of the many different applications of VR, both now and increasingly so in the future. These partnerships and agreements are centred on and around VRE's ENGAGE platform, which we will review in more detail later in this report.

### *Strategic partnership agreement with HTC Corporation in 2020*

In 2020, there was what we view as a pivotal moment for VRE and its future potential, when VRE confirmed on 20 May the successful negotiation of a strategic partnership with HTC Corporation (HTC). This came about after VRE successfully rose to the challenge to host the 2020 HTC Vive Ecosystem Conference via ENGAGE, which would otherwise have been cancelled due to the global impact of COVID-19. Based in Taiwan, HTC is a technology innovation company and global leader in VR technology and equipment through its VIVE platform and ecosystem. The partnership included HTC investing €3.0m (£2.64m) in VRE via a subscription issue for a 20% stake in the group, alongside a global Distribution and License Agreement for VRE's proprietary ENGAGE platform, running for an initial four-year period. The agreement includes a guaranteed minimum quarterly payment of €75K to VRE from January 2021 for the duration of the agreement, irrespective of the quantum of net global revenue collected by HTC. VRE and HTC already had a close working relationship before VRE's ENGAGE platform hosted the conference, but its ability to do so acted as a catalyst for HTC to raise the possibility of a strategic partnership, which was subsequently agreed.

### *ENGAGE now positioned as a comprehensive communications platform with clearly segmented offering for principal user groups*

In its FY20 final results, published in February 2021, VRE affirmed the positioning of ENGAGE, its principal future revenue driver through user license fees, as a comprehensive communications platform. This marks a significant evolution from its early days, where ENGAGE was primarily marketed as an education and training platform, providing remote distance learning and tools to enable educators and teachers to create content. Since then, the platform has evolved to cover a broader spectrum of end-users, most notably in business and events. In recognition of this and to better communicate its proposition, VRE created three sub-brands of ENGAGE addressing its three main user groups, namely enterprise, education and events:

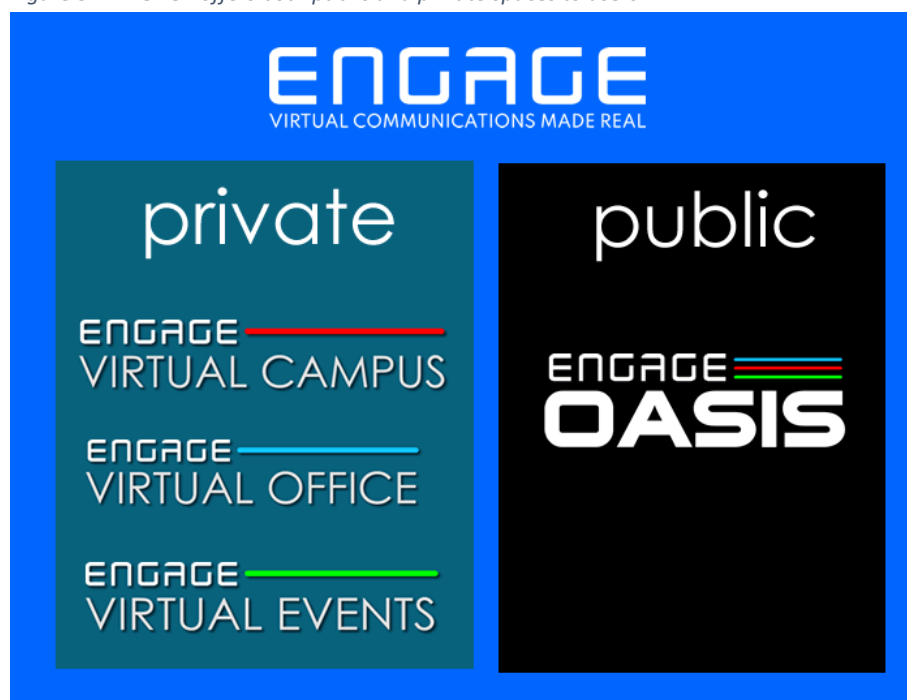
- **ENGAGE Virtual Campus** – for education clients, enabling remote classes offering persistent virtual campus/educational locations and private branded learning environments. Users have the ability to create and publish their own content, as well as using virtual collaboration tools.
- **ENGAGE Virtual Office** – for enterprise clients, facilitating remote team collaboration and meetings offering persistent virtual office locations and private branded office environments. Clients are also able to use virtual collaboration and sales presentation tools.
- **ENGAGE Virtual Events** – for event clients, enabling the hosting of large-scale virtual events in a safe environment with large cost savings over traditional events. These offer a wide range of unique content possibilities.

## VR Education Holdings

**Launch in 2022 of ENGAGE Oasis, a fully featured corporate metaverse, aspiring to be the LinkedIn of the metaverse**

Further significant news was delivered alongside a €9m equity placing in June 2021, marking the next stage of ENGAGE's development and service proposition. VRE announced that it is to go live in 2022 with a fully featured corporate metaverse. ENGAGE Oasis, as it will be known aspires to be and become the LinkedIn of the metaverse. It should further boost the appeal of the ENGAGE platform and accelerate the delivery of VRE's medium-term financial objective. We explore ENGAGE Oasis in more detail later in this note.

Figure 3 – ENGAGE offers both public and private spaces to users



Source: VRE

**VRE building partnerships across expertise domains to drive ENGAGE platform growth**

The advent of COVID-19 has greatly accelerated trends for the wider adoption of VR. It has massively increased interest in conferencing and collaborative tools in both business and education, with VR platforms offering a superior alternative to video-based communications. With telecommunications, hardware, software and companies all involved in this process, VRE has been successfully building partnerships across these expertise domains to drive the growth of its ENGAGE platform.

The following chart summarises the key events and milestones in VRE's development since it was founded in 2014.



## VR Education Holdings

Figure 4 - Summary of key events for VRE – 2014 to present

Date	Event
<b>2014</b>	
<b>October</b>	Immersive VR Education (IVRE) founded by David and Sandra Whelan in Waterford, Ireland.
<b>2015</b>	
<b>April</b>	IVRE releases a prototype of its first VR Showcase experience, Apollo 11, on Kickstarter, subsequently securing €36K in pre-orders to fund its completion.
<b>September</b>	In-house testing of prototype ENGAGE platform ahead of creation of a VR simulation training in conjunction with the Royal College of Surgeons (Ireland).
<b>2016</b>	
<b>March</b>	Developmental version of ENGAGE platform released free of charge to users on the computer gaming platform, Steam.
<b>April</b>	Apollo 11 VR experience released on the Steam and Oculus platforms, compatible with leading headsets, Oculus Rift and HTC Vive.
<b>September</b>	Prototype version of company's second VR Showcase experience, Titanic VR, released
<b>2017</b>	
<b>January</b>	Titanic VR and ENGAGE prototypes used by HTC at the global consumer electronics and technology show, CES, to showcase its Vive VR hardware.
<b>March</b>	Release of Apollo 11 VR experience in Europe on the PlayStation store, followed by the United States in July.
<b>Q1</b>	Undertook work with Oxford University and HTC to create a Life-Saving Instruction for Emergencies (LIFE) VR training simulation, with a view to improving infant care through virtual distance learning.
<b>October</b>	Entered discussions with the BBC to create a World War 2 themed VR experience, with work commencing in February 2018. VR Education Holdings plc incorporated as holding company of IVRE.
<b>November</b>	Early access version (Part 1) of Titanic VR experience launched.
<b>2018</b>	
<b>March</b>	IPO of VRE, dual listing on AIM and ESM. Shares priced at 10p, raising £6m gross in IPO placing.
<b>May</b>	Apollo 11 VR experience selected by Oculus as part of launch promotion for its Oculus Go standalone headset.
<b>August</b>	Titanic (Part 2) VR experience launched on Oculus and Steam.
<b>October</b>	Release of 1943 Berlin Blitz, developed in partnership with the BBC.
<b>November</b>	Both Titanic VR and Apollo 11 experiences released across more platforms.
<b>December</b>	Full commercial release of ENGAGE online virtual learning and corporate training platform.
<b>2019</b>	
<b>May</b>	Commercial agreement signed with South Korean immersive digital content company, D'Carrick. Commercial agreement signed with US Space & Rocket Center to use the Apollo 11 VR experience. Apollo 11 VR selected as launch title on Facebook's global launch of its new Oculus Quest headset and as part of its Oculus Anywhere Programme.
<b>October</b>	ENGAGE platform selected by Facebook for its Oculus Independent Software Vendors (ISV) programme.
<b>November</b>	ENGAGE platform selected by LIFE for roll out of training app. Launch of new VR Showcase experience, Shuttle Commander, on PlayStation.



## VR Education Holdings

<b>December</b>	VRE partners with Deutsche Telekom, Qualcomm and XRSPACE to launch new 5G VR headset. ENGAGE launched on HTC Viveport platform. Agreement with US Space & Rocket Center extended by further 12 months from 19 December.
<b>2020</b>	
<b>March</b>	VRE announces hosting of 2020 HTC Vive Ecosystem Conference via its ENGAGE platform. VRE announces discussions entered with HTC with view to forming a strategic partnership.
<b>April</b>	Partnership agreement signed with Victory XR, a US-based leader in VR and AR content creation for schools and colleges.
<b>May</b>	Strategic partnership with HTC announced, with HTC investing €3m for 20% stake in enlarged share capital.
<b>July</b>	Memorandum of understanding signed with Virtual College, a digital learnings solution provider in Middle East and UK. Launch of ENGAGE Mobile for android phones and tablets, with iOS and iPhone versions planned later in 2020. Multi-year licence agreement announced with Tokyo Global Gateway, an experience-oriented English-education facility.
<b>September</b>	Shuttle Commander launched on original Oculus Quest and Oculus Quest 2 headsets. Yahoo! celebrates its 25th anniversary with an ENGAGE-hosted event, the first such originating from the HTC partnership.
<b>October</b>	HTC launches ENGAGE in China, reselling the platform as VIVE Sessions.
<b>November</b>	ENGAGE available and supported on the Facebook Oculus store.
<b>December</b>	Release of iOS version of the ENGAGE platform via the Apple APP store.
<b>2021</b>	
<b>January</b>	VRE outlines its medium-term outlook objectives for 2023 - 2025, including ENGAGE revenue of €10m.
<b>February</b>	Core service offerings re-branded as ENGAGE Virtual Campus, ENGAGE Virtual Office and ENGAGE Virtual Events. ENGAGE reaches milestone of 100 customers.
<b>May</b>	HTC announces VIVE Sessions to be included in the software bundle of its new headset, VIVE Focus 3 XR, and a partnership with HP to roll out VIVE Sessions on HP ProBook laptops sold within China.
<b>June</b>	Facebook renews its ENGAGE enterprise account, doubling the number of user licenses. VRE completes a €9m equity placing to accelerate the delivery of its medium-term outlook objectives, including the launch in 2022 of a fully featured corporate metaverse, ENGAGE Oasis.

Source: VRE, Shard Capital

## Market Backdrop and Outlook

Before looking in further detail at VRE, we first look at the market within which it operates and the outlook for future growth potential.

### Virtual Reality (VR)

Virtual Reality applications have been in development since the mid 1960's, with renewed interest in the application resulting from the commercial launch of the Oculus Rift VR headset in March 2016. Further development and investment into virtual reality and augmented reality (VR/AR) hardware for commercial use has been fast paced over the past few years. Companies such as Facebook with its purchase of Oculus in 2014, HTC, Sony, Google, Microsoft, Apple and Samsung have been leading the charge in the development and marketing of VR.

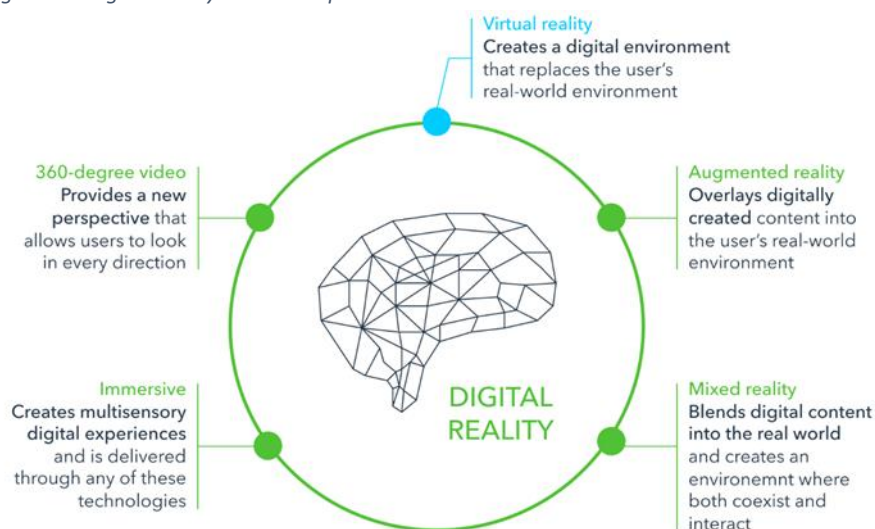
**VR's sense of being in a different environment or reality is known as immersion**

Virtual Reality (VR) is where one's existing view of the real world is replaced with a digital world. VR is a simulated, software-generated three-dimensional (3D) experience that places the user in a virtual environment, with which they can interact. This virtual environment surrounds the user, enabling them to explore and manipulate it, a sensation heightened by the use of haptic controllers, which act as hands. This sense of being in a different environment or reality is known as immersion. While VR is quintessentially a digitally created version of reality, elements from the physical world can be referenced and utilised within VR.

**Augmented Reality (AR) and Mixed Reality (MR) are two other categories of computer-enhanced reality**

In addition to VR, there are two other categories of computer-enhanced reality. Augmented Reality (AR) overlays digital information onto objects and/or locations in the real world or one's existing reality. The best and most well-known example of this is the Pokémon GO mobile game. Mixed Reality (MR), as the name suggests, is a hybrid of VR and AR, combining elements of each. MR creates a space where physical and digital objects co-exist and interact in real time together by mixing real and virtual environments. These three versions of reality are often categorised together as Extended or Crossed Reality (XR).

Figure 5 – Digital reality – core components



Source: Deloitte Insights

## VR Education Holdings

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### *Head mounted devices required for fully immersive effect*

Access into both the VR and MR worlds comes through wearing a head mounted device (HMD) that allows the user to be immersed in another environment or location. AR by contrast does not necessitate the use of an HMD. As in all consumer electronics and wearables, there is a range of different options in terms of price and specification, which continues to evolve. Premium sets typically required high specification PCs (or laptops) and high-speed internet connections to provide the highest levels of graphics and immersion, which can be very costly as a total package. Premium tethered headsets such as the Valve Index retail at around £900 in the UK. At the opposite end of the scale, entry level headsets are usually for use with smartphones, which are inserted within the headsets to provide the screen. The very cheapest of these was the Google Cardboard, retailing for around £10, though this has now been discontinued. Other models in this category, such as the Samsung Gear VR, cost around £85.

### *Emergence of standalone or untethered headsets has made VR market accessible to a wider audience*

There has been a significant breakthrough in recent years with the emergence of standalone or untethered headsets, which do not need to be physically attached to a computer. These cordless headsets tend to be lighter, cheaper and offer fewer physical restrictions than the corded premium models. On early models, such as the Oculus Go, launched in the US in 2018 at the breakthrough \$199 price point, there was however also a lower level of functionality compared with corded headsets, which had superior definition, wider field of vision and better positional tracking. It did however fulfil one of its main functions, which was to bring VR into the consumer mainstream with an affordable price point.

In 2019, Oculus launched its Oculus Quest model, which is more advanced than the Oculus Go, and more akin in quality to its corded Oculus Rift headset. At launch in the US, the 64GB version retailed at \$399 and the 128GB version was priced at \$499. In a sense, the standalone Oculus Quest, with its higher specification, including six degrees of freedom (6DoF), offered access to a more premium experience, but without the necessity of needing a high-end PC/laptop to deliver it. It served as a crossover product between the Quest (for market entry/access) and the Rift (for premium, top-end experience). Its success was such that Oculus discontinued the Go model and has subsequently brought out an upgraded Quest 2 and other models. The roll-out and adoption of 5G will weaken, if not ultimately sever, the necessity to be tethered to a desktop, although there is likely to remain a specialist niche segment for high-end tethered devices.

Other high quality standalone VR headsets have included the HTC Vive Focus, Pico Goblin and Pico Neo, Lenovo Mirage Solo, and Xiaomi Mi VR (essentially a re-branded Oculus Go for the Chinese market) and manufacturer ranges continue to evolve with the launch of new and often upgraded models. These range in price, depending on features and quality, with the most expensive models featuring 6 Degrees of Freedom (6DoF), compared with 3DoF in the cheaper versions. Degrees of Freedom are the number of ways a user can move within VR, so the higher the number, the more immersive the experience. Oculus Quest 2, Oculus Rift S and PlayStation VR typically currently retail for around £250 - £400 in the UK.

### *Mooted launch of Apple devices will further stimulate the VR market*

Apple is also reportedly looking to launch its own VR headset at some stage, as well as AR spectacles (Apple Glass). The launch of Apple Glass had been mooted in some trade press publications to be slated alongside the launch of iPhone 12 in Autumn 2020, though COVID-19 developments and restrictions could push this back. The VR headset is unlikely to hit the consumer market until 2022, based on trade press reports (eg LaptopMag). The entry of Apple into the VR market would be another major boost to the VR market and its acceptance into the consumer mainstream.

## VR applications

### *Ability to visit imaginary worlds or places that may be impossible or dangerous in real life*

VR allows users to visit imaginary worlds or places that may be impossible or dangerous to visit in real life. There are two key characteristics of virtual reality, namely the ability to experience and the means to interact. These give the user a sense of complete immersion within the simulation as it involves the senses. It thereby makes it more believable and engaging for the user, with VR proven to be a powerful resource that can aid and indeed improve on conventional learning methods.

## VR Education Holdings

**Many VR benefits in education and training.....**

**.....and many other areas of commerce, ranging from healthcare to manufacturing, automotive, oil & gas and aerospace & defence**

**VR also being embraced by the entertainment and music industries**

**VR will benefit a broad spectrum of commercial, educational and consumer applications**

**VR household penetration low but rising, reflecting early life-cycle stage**

The benefits of VR in education and training are being increasingly discovered, resulting in a wider take-up within the educational and commercial sectors. Humans derive and retain information from their environment. They learn by interacting, and indeed memory retention increases when learning through interactivity. Virtual reality-based learning provides an immersive teaching method that allows users to interact with environments around them. Abstract concepts and historical times can be experienced through VR, opening up countless possibilities that did not previously exist.

A Fortune Business Insights report in 2018 highlighted its expectation of a high level of VR take-up in the education and healthcare sectors, areas where VRE has been active pretty much from its inception. It also pointed out the potential importance of VR as a training tool across many other areas of commerce, ranging from manufacturing, automotive, oil & gas and aerospace & defence. VR is a particularly relevant and cost-efficient as a training tool to teach newcomers into dangerous or high-risk workplaces and to simulate dealing with dangerous or emergency situations without actual risk to the physical wellbeing of those involved. The learning & simulation and educational applications of VR were forecast to see “lucrative growth” over the report’s forecast period up to 2026, led by the education, healthcare and automotive sectors.

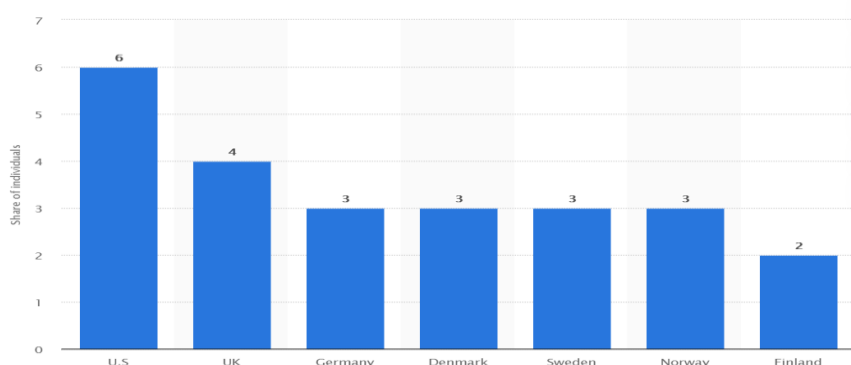
VR is also being actively embraced by the entertainment and music industries as a powerful tool to engage global audiences. Music groups, such as the Dutch symphonic rock band Within Temptation turned to VR technology to produce and perform The Aftermath – A Show In A Virtual Reality, following the enforced cancellation of many live concerts due to Covid-19 restrictions. Fans were able to buy tickets for the concert and watch it online. Abba will also make use of VR technology for its virtual concerts following the release of their Abba Voyage reunion album, which will include so-called “Abba-tars” (avatars) for delivering a series of virtual concerts.

It is clear from the above in our view that VR will continue to grow rapidly over an increasingly broad spectrum of commercial, educational and consumer applications. The next section looks in more detail at the take-up of VR including longer-term growth forecasts.

## Market penetration and growth forecasts

The VR market is still in the early stages of its product lifecycle, with low levels of consumer and business penetration, albeit a market that is growing and is consistently forecast to grow rapidly over the medium- and longer-term. The following chart from Statista shows the share of individuals with household access to a VR device by selected North European countries and the United States in 2020. These range from 2% in Finland to 6% in the US, with a median penetration of 3%. The UK has a reported penetration of 4%.

Figure 6 – Share of individuals with household access to VR device – 2020 (%)



Source: Statista

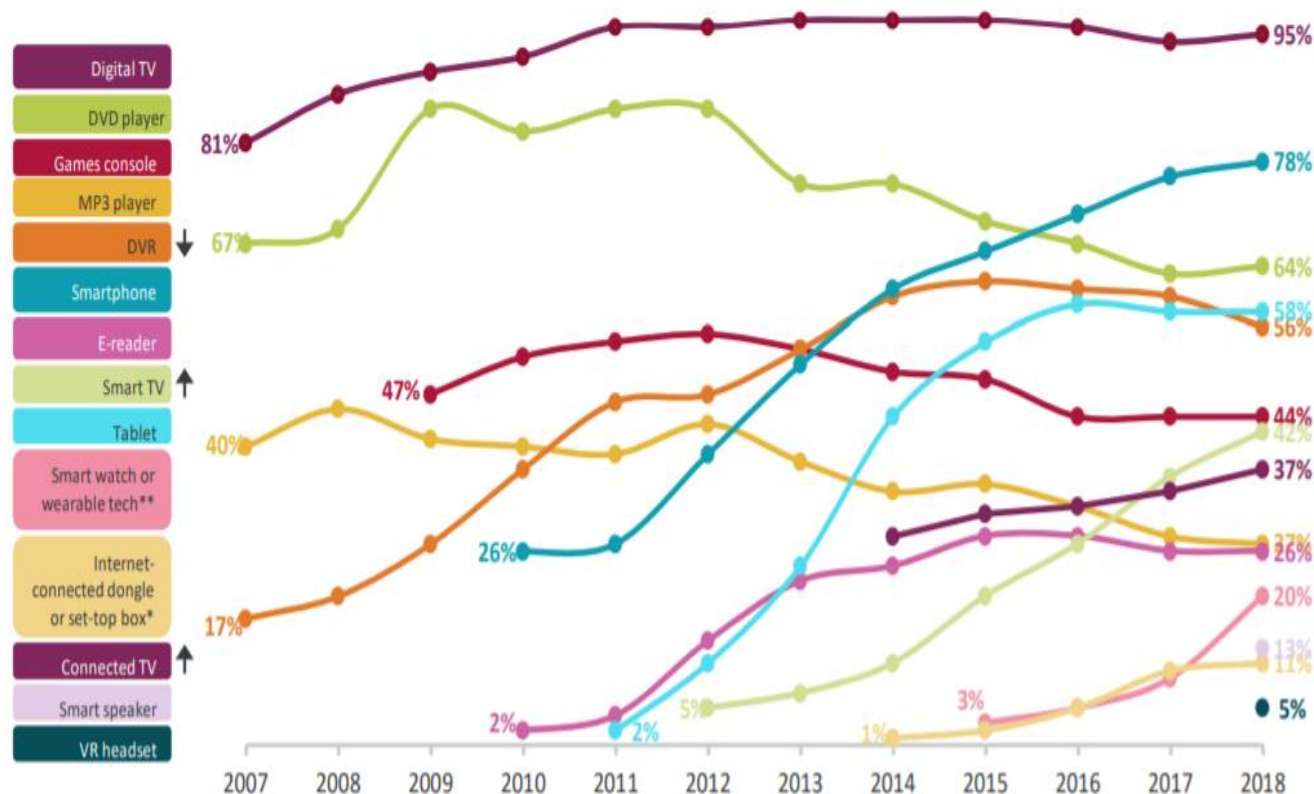
## VR Education Holdings

To put this in a broader context, the following table shows the evolution of UK household penetration of a variety of consumer communications and audio-visual devices between 2007 and 2018. The source of the chart is the Ofcom Communications Market Report, published in August 2018, and the statistics are based on Ofcom's quarterly Technology Tracker. VR headsets and smart speakers were included for the first time in 2018. With household take-up of 5% and 13% respectively, these newer technology products remain a consumer niche rather than mainstream product at this stage.

### Smart TV penetration in UK grew from 5% to 42% in just six years

However, it can clearly be seen from the evolution of many of the other products that household penetration can grow very quickly in a short space of time. For example, smart TV's had a penetration of 5% in 2012, the same level as achieved by VR headsets in 2018. Within the space of six years though, smart TV penetration had leapt to 42% of households, also helping to explain in all likelihood the falling back in digital video recorders (DVR's), as households used smart TV's to access on-demand programming and to time shift their viewing. Similarly, smart phone penetration jumped from 26% in 2010 to 78% in 2018.

Figure 7 - Evolution of household take-up of digital communications and audio-visual devices – 2007 – 2018 (%)



Source: Ofcom Market Communications Report 2018

### Technology adoption patterns similar in the US, including mobile AR in recent years

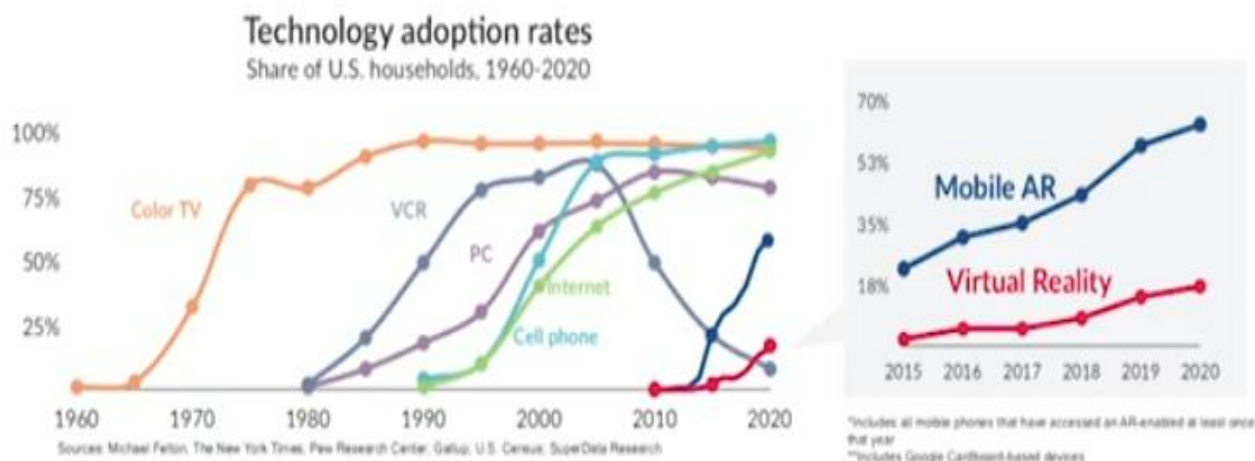
This pattern of new technology adoption is borne out by similar data from the United States in the following chart, which includes the advent of colour TV in the 1960's, and its adoption by around 80% of US households by 1980. The chart on the left-hand side shows the nascence of both VR and Mobile AR, the latter referring to AR accessed via a mobile device ie phone or tablet without the necessity for other hardware. This partly explains its rapid consumer take-up, with a trajectory similar to the early growth of the colour TV and later the mobile phone. While the adoption of AR within popular social media apps such as Snapchat and Tiktok also helps to explain its growth rate, AR is being increasingly embraced by commercial organisations as well. A good example of this is consumer goods manufacturers and retailers using AR to help consumers visualise their products "in situ" within the consumers life eg Ikea enabling its products to be seen within consumers' homes or Rolex showing how different models look on a consumer's wrist. While VR's growth trajectory to



## VR Education Holdings

date has not been as rapid as that of Mobile AR, its growth in penetration over the past five years is not dissimilar to that of the first five years of internet adoption – and look at where that stands 25 years later and the role it plays in everyday consumer and commercial life.

Figure 8 - Technology adoption rates in the USA – 1960 – 2020 (%)



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Source: SuperData

**Post COVID-19 trends, combined with the advent of an ever faster 5G network, to provide a powerful tailwind for VR**

**Forecasts projecting significant growth for VR markets and services**

These examples show how quickly devices, which add value to consumers and/or are a superior version of a historic predecessor, can gain traction, market share and become an integral part of everyday life. While there can be no guarantee that this will happen to VR headsets and the broader VR/XR market, we believe that recent trends emerging from the COVID-19 situation, combined with the advent of an ever faster 5G network, will provide a powerful tailwind for VR.

Our view is generally borne out by third party forecasts, although it must be conceded that the growth in VR thus far has fallen shy of market forecasts being made two to three years ago. More recent forecasts are still projecting significant growth for VR markets and services, effectively with a slippage of two to three years from the path previously projected. The current shortage of semi-conductors and other electrical components could also compromise the short-term delivery of recent market forecast projections.

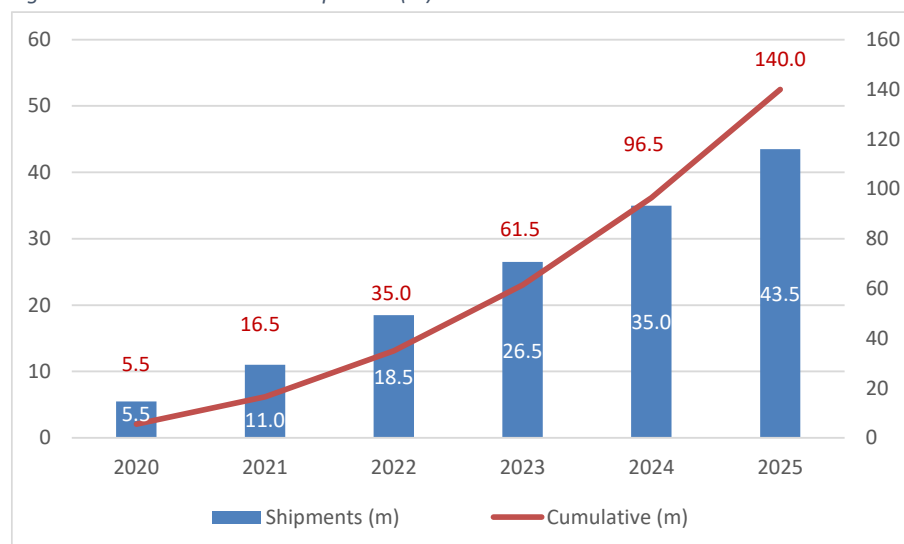
There are many different statistical sources for market growth projections, and therefore still a high degree of variance in absolute numbers, both in terms of physical shipments and market value. What they do share however is an upward direction of travel, achieved at impressive growth rates. We have reviewed data from a number of sources, including International Data Corporation (IDC), SuperData and Statista. As stated above, the key conclusion, which is consistent across all sources, is the direction of travel for VR, namely upwards and with strong compound growth rates over the medium-term (3 -5 years, typically being the range of these forecasts).

## VR Education Holdings

### Worldwide VR headset shipments forecast to see 51% CAGR up to 2025

We have selected two charts to show this positive direction of travel. The first chart shows forecasts for the volume of worldwide VR headset shipments, based on a chart from Statista. This shows a projected eight-fold increase in the volume of VR headset shipments to 43.5m units in 2025 from the base figure of 5.5m units in 2020. We have added a line to the chart highlighting the cumulative figure at each year end, which reaches 140m at the end of 2025. This equates to a five-year CAGR of 51.2%.

Figure 9 – Global VR headset shipments (m) – 2020 - 2025



Source: Statista, Shard Capital

### Forecasts vary between providers, but direction of travel is clear and positive

The second chart below from IDC forecasts global shipments will rise from 7.06m units in 2020 to 76.71 by 2024, delivering a four-year CAGR of 81.6%. It is notable that IDC's base figure for shipments in 2020 is around 1.5m units higher than the equivalent Statista figure for 2020, with the IDC forecasts consistently higher thereafter. Whilst there are differences, both concur that headset shipments will grow by a healthy multiple of 6.5x – 11x over the four-year period up to 2024.

Figure 10 – Forecast shipments of AR/VR headsets

AR/VR Headset Shipments, Market Share, and Five-Year CAGR by Product, 2020 and 2024 (shipments in millions)

Product Category	Product	2020 Shipments*	2020 Share*	2024 Shipments*	2024 Share*	2020–2024 CAGR*
Augmented Reality	Screenless Viewer	0.03	0.49%	0.03	0.03%	-7.07%
	Standalone HMD	0.41	5.82%	24.00	31.28%	176.39%
	Tethered HMD	0.25	3.49%	17.08	22.26%	188.45%
Virtual Reality	Screenless Viewer	0.39	5.55%	0.10	0.13%	-29.16%
	Standalone HMD	3.09	43.76%	25.25	32.92%	69.06%
	Tethered HMD	2.89	40.88%	10.26	13.38%	37.30%
<b>TOTAL</b>		<b>7.06</b>	<b>100.00%</b>	<b>76.71</b>	<b>100.00%</b>	<b>81.54%</b>

Source: IDC Worldwide Quarterly AR and VR Headset Tracker, March 18, 2020

Source: IDC



## VR Education Holdings

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The IDC data also provides an interesting degree of granularity by the type of headset, namely for both AR and VR devices. The highest growth rates for VR headsets comes from Standalone products. Standalone is forecast to retain the highest participation within both AR and VR, significantly growing its share within VR to stand at 70% of VR headset shipments in 2024, compared with 48.5% in 2020.

## Strategy and key objective...

### ....to ENGAGE the world

*Positioning of ENGAGE has evolved to become a comprehensive communications platform.....*

In its FY20 final results, published in February, VRE affirmed the positioning of ENGAGE, its principal future revenue driver, as a comprehensive communications platform. This marks a significant evolution from its early days, where ENGAGE was primarily marketed as an education and training platform, providing remote distance learning and tools to enable educators and teachers to create content. Since then, the platform has evolved to cover a broader spectrum of end-users, most notably in business and events. In recognition of this and to better communicate its proposition, VRE created three sub-brands of ENGAGE addressing its three main user groups, namely enterprise, education and events:

- **ENGAGE Virtual Campus** – for education clients, enabling remote classes offering persistent virtual campus/educational locations and private branded learning environments. Users have the ability to create and publish their own content, as well as using virtual collaboration tools.
- **ENGAGE Virtual Office** – for enterprise clients, facilitating remote team collaboration and meetings offering persistent virtual office locations and private branded office environments. Clients are also able to use virtual collaboration and sales presentation tools.
- **ENGAGE Virtual Events** – for event clients, enabling the hosting of large-scale virtual events in a safe environment with large cost savings over traditional events. These offer a wide range of unique content possibilities.

*.....with three clearly targeted Virtual sub-brands: Campus, Office and Events*

ENGAGE remains therefore the master brand, building on its accumulated heritage and goodwill, with the segmented sub-brands emphasising the “Virtual” aspect of its VR offering, while also importantly highlighting their target segment and/or application. VRE is committed to supporting and investing in these brands and anticipates markedly and sustainably higher future demand, given the changes in working and social practices resulting from the coronavirus pandemic.

*ENGAGE platform specifically designed to enable large-scale meetings and events, unlike traditional video-based platforms such as Zoom and Teams*

Traditional video-based platforms are best suited for one-on-one or small group interactions and were not designed for nor are suited to hosting large group meetings or virtual events. In contrast, the ENGAGE platform was specifically designed to enable such large-scale meetings and events, including the natural interaction of smaller sub-groups in virtual spaces outside (yet alongside) the main meeting or event. In other words, ENGAGE can replicate for example the workings of a large-scale conference, with a main auditorium, rooms for smaller group meetings or different but parallel-running presentations and the all-important chance or planned encounters with other individual attendees. Given this sustainable source of competitive advantage and superior differentiation, it is VRE’s stated ambition to supplant the likes of Zoom and Microsoft Teams for large group conferences and virtual events

### Recent news flow

*Several key events in 2021*

We summarise below the key newsflow emerging in 2021 for VRE, namely the publication of the group’s Medium-Term Outlook in January, the equity placing raising €9m gross proceeds and the announcement of the launch of the ENGAGE Oasis corporate metaverse, both of which took place in June. We also summarise the headline details of September’s interim results for 2021E.

## Medium-term outlook

**VRE has set out quantified targets....**

**...including €10m ENGAGE revenues by 2023-2025, along with key drivers**

**Substantial global market size for VRE's core segments...**

**...with estimated addressable market of \$10bn - \$25bn**

**Proceeds of June equity raise to be invested in people, and sales & marketing activities**

VRE has been a beneficiary of the extraordinary events of 2020 and 2021, which are proving to be a catalyst to its growth prospects, having engaged with many organisations across a wide swathe of industries, sectors and governmental bodies. Given the potential traction from its larger client base and its enhanced product offering, VRE outlined its key medium-term financial and commercial objectives for the 2023 -2025 period alongside its January 2021 trading update.

The headline targets are to reach ENGAGE revenues of €10m through a client base of 500 active enterprise customers, with 100,000 monthly users within the 2023 – 2025 period.

The drivers behind these objectives are:

- a compound growth rate of annual ENGAGE revenue of more than 100% from FY20
- an average 10% month-on-month increase in users to reach the stated 100,000 target, which equates to the target of 500 active enterprise customers
- a client retention rate of at least 80%
- growth in the average annual contract value to €20,000+
- a target group gross margin of at least 80%, reflecting the shift to predominantly ENGAGE revenues driving higher gross margins

Some further colour was added to this in the February full year results presentation, most notably in our view VRE's estimate of ENGAGE's total addressable market (TAM). The following table quantifies the three key global market segments ENGAGE is addressing.

*Figure 11 – Global size and growth projections of ENGAGE's core markets (USD bn)*

	Market size	Growth	Period	Market size
(\$bn - unless otherwise stated)	2020	CAGR	up to	Period end
Team collaboration software	10	12.7%	2027	24
E-learning	165	14.6%	2026	374
Events	94	23.2%	2027	404

*Source: Grand View Research, Facts & Factors*

Management estimates that the total addressable market for ENGAGE stands between \$10bn and \$25bn. Across all three segments, the stated TAM equates to between 3.7% and 9.3% of the aggregate 2020 market size of \$269bn. The three segments are also forecast to achieve strong double-digit CAGR rates averaging just under 17% over the next six years, underlining the growth potential of ENGAGE's total addressable market.

## Equity raise

On 17 June 2021, VRE announced a proposed placing to raise €8.7m (£7.5m) at 16p per share in order to capitalise on the strong growth momentum of the ENGAGE platform. This underlined the group's confidence in its VR technology platform becoming the next generation virtual communications and training solution for both enterprise and education clients. VRE outlined the intended utilisation of the net proceeds with 75% to be invested in people hires and 25% in increased sales and marketing activity.

## VR Education Holdings

### ***Sales function to increase, focused on Europe, Middle East and the US***

The larger investment in its core people asset, while across all functions, is to focus on building out its sales and marketing functions so that VRE becomes a(n even more) customer-centric organisation, devoted to and driven by customer satisfaction and success. The sales function will increase to around 25 people, with business development roles covering Europe, the US and the Middle East. Additional hires will be made in both the US and Asia to enable 24/7 customer support across all regions. Other specialist technical hires will be made to support the development of incremental product features for the ENGAGE platform.

The balance of funds raised will be invested in a raft of sales and marketing facilities, with a focus on trade show opportunities, together with targeted sponsorship and advertising activities. The prime objective of these activities is to raise global awareness of the ENGAGE platform and to further develop its customer base through direct and partner channels with a focus on the substantial markets in Asia, the US and the Middle East.

### ***VRE's contracted and under negotiation backlog approaching €10m, its stated revenue target for 2023 – 2025.***

VRE also updated on its trading process in the year to date, stating that more than €2.5m in contract value for ENGAGE subscriptions had been closed in the period. The company provided support for and comfort on some key drivers of its Medium-Term Outlook objectives, affirming that active clients had grown 10% month on month, along with a 35% increase in active licenses, in the year to date. VRE also revealed that its contracted and under negotiation backlog/order book was approaching €10m, its stated revenue target to be achieved by 2023 – 2025.

In the event, the placing offer was oversubscribed, with VRE raising gross funds of €9.0m (£7.7m), issuing 48.350m new share, equivalent to 20% of the group's issued ordinary share capital prior to the placing.

### ***VRE to go live in 2022 with a fully featured corporate metaverse, code-named ENGAGE Oasis***

Potentially the most significant news within the Placing document was VRE's announcement that it was to go live in 2022 with a fully featured corporate metaverse. Currently code-named as ENGAGE Oasis, this will become the next evolution of ENGAGE, which should increase the appeal of the ENGAGE platform and accelerate the delivery of VRE's medium-term financial objective. We explore ENGAGE Oasis in more detail in the following section.

## ENGAGE Oasis

### ***ENGAGE Oasis metaverse targets business professionals, corporations, young professionals and college students***

An evolution of the current Engage platform, ENGAGE Oasis will be an always on, fully persistent virtual world designed entirely for enterprise use cases. ENGAGE Oasis is a metaverse designed for business professionals, corporations, young professionals and college students seeking to provide professional services, sales and professional events in an immersive environment. The metaverse takes its name from the eponymous metaverse featured in the novel and film, *Ready Player One*, which was the de facto platform in VR where users meet, play and do business.

VRE's clients will not only be able to meet professionally but also to sell products and services directly to each other, whether they're a global corporation, business professional, college student or digital artist. Individuals will also have their own personal space within the metaverse, to which they can invite people for more social interactions. The design of ENGAGE Oasis will help foster new connections either within a company or externally.

### ***Most metaverses to date are centred around games, appealing to a much younger audience profile***

Based on the existing profile of ENGAGE platform customers, it will have a predominantly professional and adult demography, compared with many of the more established metaverses, such as those created by Roblox, Epic and Unity. These metaverses are centred around games, appealing to and attracting a much younger audience profile. They have successfully captured substantial audiences and similarly substantial multi-billion dollar valuations, pointing to the potential upside in terms of shareholder value creation for VRE. CEO, David Whelan, has been quoted as saying: ***"If Rec Room and Roblox are the TikTok and Twitch of the metaverse, we want ENGAGE Oasis to be the LinkedIn of the metaverse"***. This succinctly captures the positioning, culture, ethos and aspiration of ENGAGE Oasis within the rapidly expanding universe of metaverses, which have become an even hotter topic over the past 18 months, with interest heightened by the constraints imposed on the physical world imposed by the coronavirus pandemic.

## VR Education Holdings

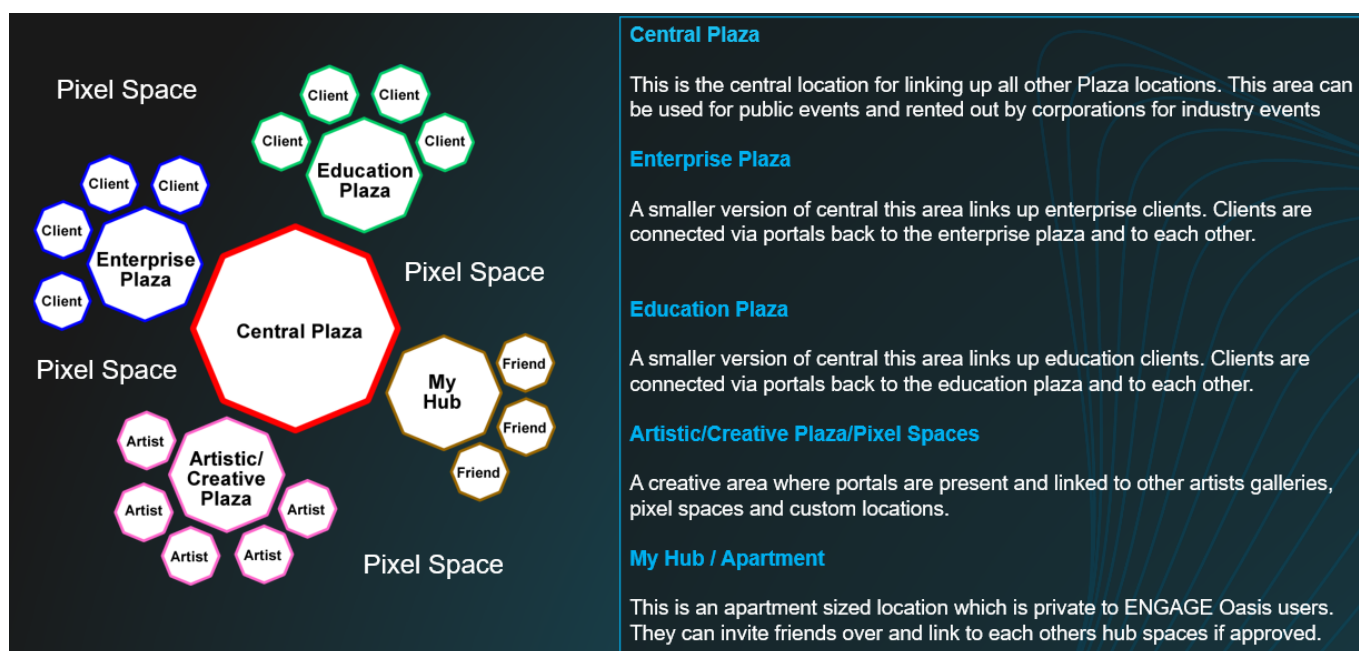
***Differing levels of access within the metaverse, with moderators to ensure compliance to guidelines***

With its professional focus, ENGAGE Oasis will have avatars and virtual locations tailored to those needs, allowing corporations to freely tailor their sector to their own style and branding, setting their own guidelines and using their own moderators in the process. While it is envisaged that parts of the metaverse will be freely accessible public areas under the auspices of VRE, there will be further levels accessible for example only to subscribing users, or to employees of corporate spaces, in order to control access of various types of content and services.

***A marketplace will facilitate the sale of products, services and creative IP***

VRE will also create a marketplace where alongside the sale of physical items and services by corporate users, creators and artists can sell digital items and provide services, bought using non-fungible tokens (NFT's), fiat currencies and cryptocurrencies. As the creator of the marketplace, VRE would be paid a commission on all sales made through the marketplace. Investment in ENGAGE Oasis is currently focussing on the creation of both the marketplace and scalability. It should be remembered however that many of the features that will be a key part of the Oasis metaverse experience have already been built and are operational within the ENGAGE platform. Given the target audience for ENGAGE Oasis, VRE will underline its credentials and the quality of the platform by seeking ISO certification and is currently undergoing an ISO compliance audit to that end

Figure 22 - Conceptual schematic of ENGAGE Oasis metaverse



Source: VRE

***A number of revenue streams for VRE from ENGAGE Oasis***

VRE should benefit from a number of revenue streams through ENGAGE Oasis. These will come not only from marketplace commissions, license and subscription fees, but also from asset sales for prime space and locations within the metaverse, advertising, hiring out central prime locations for other third-party events such as concerts, lectures and product launches. Ahead of its launch and customer reaction to this metaverse, it is difficult to forecast revenue generation and the shape of their growth curve. What is clear however, especially given that the move to launch the metaverse was made in response to customer requests, is that there is real demand and potential for this development.

## VR Education Holdings

**Introductory video available on corporate website and company's YouTube channel**

An introductory video explaining the ENGAGE Oasis metaverse concept can be found on VRE's corporate website, together with other information on the group's service offerings. A number of other helpful videos offering insight into VRE's capabilities can also be found on YouTube at [www.youtube.com/c/ImmersiveVREducation](http://www.youtube.com/c/ImmersiveVREducation).

## Interim results

**A first half of strong progress**

VRE's interim results to end June 2021 showed further strong progress, especially on the turnover and gross margin fronts. The following table gives a headline summary of the key components of the H1 performance.

Figure 13 – Overview of interim results (€'000, unless otherwise stated)

€'000 unless otherwise stated	FY20	FY21	Change	% change
Turnover	681	1,248	567	83%
Gross profit	478	993	514	108%
Gross margin (%)	70.2%	79.5%		
EBITDA	(875)	(956)	-81	9%
EBITDA margin (%)	(128%)	(77%)		
Operating loss	(1,130)	(1,295)	(165)	15%
Operating margin (%)	(166%)	(104%)		
Pre-exceptional pre-tax loss	(1,133)	(1,298)	(165)	15%
Reported pre-tax loss	(1,133)	(1,298)	(165)	15%
Pre-exceptional EPS (€)	(0.005)	(0.004)	0.001	(20%)
Reported EPS (€)	(0.005)	(0.004)	0.001	(20%)
Net cash	3,234	9,192	5,958	184%

Source: VRE, Shard Capital

**Revenue rose 83%, with higher gross margin and improvement in EBITDA margin**

Revenue increased by 83% over last year to €1.25m and was accompanied by a strong uplift in gross margin to 79.5%, reflecting the increased mix participation of the ENGAGE platform's revenue stream. The gross profit contribution more than doubled to just under €1.0m. With VRE continuing to invest in recruitment to drive and support its growth plans, losses at both EBITDA and operating levels saw small increases. The EBITDA and operating margins registered considerable improvement however, aided by the gross margin expansion together with the increase in operating costs being outstripped substantially by the rise in turnover. The EPS loss saw a marginal improvement, though this does not reflect the full dilutive impact of the June equity placing. Net cash stood at €9.2m at the period end, compared with €3.2m at the H1 period end last year (and €2.0m at the FY20 year-end). This implies a monthly cash utilisation of just over €220K per month over the H1 period this year.

Figure 14 – H1 revenues by business stream (€'000)

	FY20	FY21	Change	% change
ENGAGE	224	905	681	304%
Showcase Experiences	426	286	(140)	(33%)
Museums/other services	31	58	27	86%
Total	681	1248	567	83%

Source: VRE, Shard Capital

## VR Education Holdings

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***ENGAGE revenues up over 300%,  
delivering 50% increase their total  
FY20 revenues***

The table above gives better insight into the composition of group turnover in H1, broken down into the three component revenue streams. In line with group strategy, the star performer was the ENGAGE platform, where revenues jumped by over 300% to €0.9m. This is 50% higher than the ENGAGE revenues generated across the whole of FY20. VRE had equalled the revenue for the whole of FY20 by the end of April this year. The H1 turnover increase for ENGAGE has been driven by a full six-month contribution from clients gained in FY20, together with initial part-period contributions from onboarded clients gains in H1 of the current financial year.

***ENGAGE revenues up to 72% of  
group sales mix***

In the absence of new titles and with no VR headset available for PlayStation 5, revenues for Showcase Experiences reduced by around a third in the period to €286K. Revenues from Museums suffered significantly across H1 last year, as the pandemic saw facilities closed to the public during lockdowns. There has been some improvement this year as economies started to open up again, with the result that revenues rose almost 90% to €58K. The combined participation of Showcase Experiences and Museums/other services decreased to 27.5% from 67% last year. The natural corollary of this is the increased participation of ENGAGE, which rose from 33% last year to 72.5% this year.



## Forecasts

**Our forecasts predicated around growth path for ENGAGE in VRE's Medium-Term Objective plan**

Our forecasts are predicated on and built around VRE's growth ambitions as laid out in its Medium-Term Objective plan and described above. The key headline target is to reach €10m of ENGAGE revenues within the 2023 – 2025 period. This is based on assumed rates of client acquisition, client retention and growth in average annual contract value, delivering a compound annual growth rate of annual ENGAGE revenue "in excess of 100%". A simple compounding of VRE's €0.6m ENGAGE revenues by 100% would deliver some €19.2m of ENGAGE revenues in 2025.

This plan was published ahead of the recent announcement of the planned launch of the ENGAGE Oasis metaverse, which should greatly increase both the appeal and the revenue-generating ability of the ENGAGE platform. The following table lays out our growth forecasts for the three revenue streams within VRE. This clearly shows and underlines the importance of the ENGAGE platform as the core revenue generator for VRE.

Figure 15 – Forecast revenue build by service stream – 2018 – 2023E

	2019	2020	2021E	2022E	2023E	3-yr CAGR
ENGAGE revenue	0.092	0.599	1.918	4.315	9.278	149.2%
Showcase experience	0.806	0.750	0.450	0.300	0.300	(26.3%)
Service/other revenue	0.126	0.067	0.117	0.264	0.264	57.9%
<b>Total turnover</b>	<b>1.025</b>	<b>1.417</b>	<b>2.485</b>	<b>4.879</b>	<b>9.842</b>	<b>90.8%</b>

Source: Shard Capital, VRE

**Conservative forecasts deliver decline in Showcase Experiences revenues**

Showcase experiences, which provided the main revenue stream in VRE's early days, are unlikely to see further titles added in our view. In addition, with PlayStation 5 still without a VR headset, revenues could continue to drift back, which we have reflected in our conservative forecasts for this business stream. While Museums have started to pick back up, VRE's sales efforts are fully focussed on the winning of new ENGAGE clients and on increasing the user base within existing clients.

**VRE has passed the 100-client milestone with some important client gains and renewals, including Facebook**

VRE has clearly had some successes on this front, as reflected in recent trading updates and passing the 100-client milestone. Facebook has for example renewed its enterprise account, doubling the number of licenses upon renewal. VRE has also won an ENGAGE contract with one of the world's largest consumer goods companies (in the world top 100 companies by revenue) and another major US multinational has agreed a contract to use the ENGAGE Virtual Office service solution. Other major contract wins in 2021 thus far include KPMG, Abbott Laboratories, MongoDB and the US State Department.

**Our forecasts show ENGAGE CAGR of 150%, reaching €9.3m in 2023E**

We have therefore assumed a CAGR growth rate of just under 150% over our three-year forecast horizon, which drives ENGAGE revenues of €9.3m in 2023E, with total group revenues just shy of €10m.

**Operational gearing benefits deliver improving EBITDA and operating margins**

The group turnover figure of €9.8m in 2023E delivers a three-year CAGR of 91%, as outlined in the table below. With the higher gross margin ENGAGE platform revenue stream taking a growing proportion of group revenues, this results in a rising gross margin at the group level. Our forecast shows this rising over the next three years to reach 86% in 2023E. With staff costs as the major expense line and the front-end loading of investment in staff to drive future growth, the rapidly rising turnover line translates into positive operational leverage. This sees operating costs falling as a percentage of sales over time, delivering improving levels of EBITDA and operating margin.

Figure 16 – Summary of key VRE forecasts – 2018 – 2023E

	2019	2020	2021E	2022E	2023E	3-yr CAGR
<b>Turnover</b>	<b>1.025</b>	<b>1.417</b>	<b>2.485</b>	<b>4.879</b>	<b>9.842</b>	<b>90.8%</b>
Gross profit	0.623	1.013	1.916	4.053	8.473	103.0%
Gross margin (%)	60.8%	71.5%	77.1%	83.1%	86.1%	
<b>EBITDA</b>	<b>(1.438)</b>	<b>(2.067)</b>	<b>(2.819)</b>	<b>(3.795)</b>	<b>(0.435)</b>	<b>(40.5%)</b>
EBITDA margin (%)	-140.4%	-145.9%	-113.4%	-77.8%	-4.4%	
<b>Operating profit</b>	<b>(1.932)</b>	<b>(2.721)</b>	<b>(3.428)</b>	<b>(4.242)</b>	<b>(0.483)</b>	<b>-43.8%</b>
Operating margin (%)	-188.6%	-192.1%	-137.9%	-86.9%	-4.9%	
<b>Pre-exceptional pre-tax loss</b>	<b>(1.939)</b>	<b>(2.728)</b>	<b>(3.428)</b>	<b>(4.242)</b>	<b>(0.483)</b>	<b>(43.8%)</b>
Reported pre-tax loss	(1.939)	(2.728)	(3.428)	(4.242)	(0.483)	(43.8%)
<b>Pre-exceptional EPS (€)</b>	<b>(0.010)</b>	<b>(0.011)</b>	<b>(0.013)</b>	<b>(0.015)</b>	<b>(0.002)</b>	<b>(47.2%)</b>
Reported EPS (€)	(0.010)	(0.011)	(0.013)	(0.015)	(0.002)	(47.2%)
<b>Net cash/(debt)</b>	<b>1.293</b>	<b>2.033</b>	<b>7.624</b>	<b>3.550</b>	<b>2.748</b>	<b>10.6%</b>

Source: Shard Capital, VRE

**Our forecasts see VRE moving to positive EBITDA trading position in H2 2023E**

Notwithstanding this, we forecast increasing losses in 2021E and 2022E, with the benefits of achieving critical mass in terms of top line revenue in 2023E leading to a significant reduction in EBITDA and operating loss. While not explicit in our full-year forecasts below, our forecasts imply that VRE will move into an EBITDA positive trading position in H2 2023E. The operating losses will see VRE's net cash position decline over our forecast horizon, with the move into positive EBITDA territory in the latter part of 2023E should not only arrest the decline in net cash but actually reverse it, with VRE generating cash from 2024E onwards.

More detailed forecasts of our P&L, cash flow and balance sheet forecasts can be found later in the Summary Financials section of this note.

## Valuation

**Compilation of peer comparator group complicated by dearth of directly comparable listed companies**

We believe there are very few listed companies that are directly comparable to VRE, which reflects our view of the unique characteristics of VRE as an investment proposition. This makes the compilation of a peer group of comparative companies (compcos) more difficult and renders valuation comparisons less useful than in cases where there are more ready comparators. We have selected a peer group of companies with overlapping characteristics to VRE to varying degrees, involved in VR, proprietary software and IP development (including video games development), education, and vocational & technical skills training. Our peer comparator (compcos) cohort has been selected not just from the UK, but also North America and Europe. It includes an array of sizes in terms of market capitalisation from Small Cap to Large Cap companies.

**Key valuation metric of EV/sales**

In addition, other traditional valuation metrics such as price/earnings ratio (PER) and EV/EBITDA cannot be applied to VRE while it continues to invest in its service offering, proprietary online platform and driving revenue growth and has yet to reach profitability. As with other high growth and online companies, the market relies primarily on turnover-related metrics. The principal measure applied is EV/sales, which yields an enterprise valuation multiple relative to a company's turnover in any given year. In effect, this metric is a valuation measure of the sales generated by a company. This metric often yields optically high Year 1(E) multiples for high growth companies, which fall markedly in outer years to reflect the substantial growth of turnover. In contrast, more mature companies with lower rates of sales growth from a larger base typically have lower EV/sales metrics, which fall away less rapidly, reflecting their more modest levels of sales growth.

Another reason for the enduring use of the EV/sales metric is that metrics are typically positive, which is useful for start-up and/or high growth companies reporting EBITDA and PBT losses. Of itself, this metric gives no direct insight into sales growth, profitability and margins, or indeed the quality of these factors. The EV/sales metric can be argued to give indirect insight into these, but it should be recognised that EV/sales as a standalone metric can be a somewhat limited and blunt instrument in our view.

**Comparisons based on consensus forecasts (and Shard Capital forecasts for VRE)**

In the following table, we compare VRE to the selected compcos using the EV/sales valuation metric. This table is based on consensus forecast data from Refinitiv Eikon and is presented on a calendar year basis to permit direct comparability as company year ends differ. It therefore coincides with VRE's December year end. It should be noted that VRE sales forecasts used for the purposes of this table are our own forecasts. CY1 refers to the calendar year to December 2021, CY2 to end December 2022 and CY3 to end December 2023. It should also be remembered that analyst coverage of individual stocks varies considerably and that no forecast aggregator has access to all analyst forecasts. We have also included the specific year-on-year sales growth figures, as this more explicitly demonstrates the relativity between high(er) and low(er) growth companies than simply relying on the EV/sales metric. We have also included the market capitalisation, expressed in sterling (£m) for ease of comparison, alongside the country where each stock has its primary listing.

**Compcos show wide variance in terms of EV/sales and rate of sales growth**

The table shows a wide variance across companies for both the EV/sales metric and sales growth in all three forecast years. To smooth out the impact of metric outliers, we have also included unweighted averages and the median for each year, which also include VRE. We have also indexed VRE to the average and median figures collated (where 100 would equate to the compco average/median), as well as to the highest metric within the peer cohort. We have emboldened and italicised the best in class metrics for ease of reference. For both EV/sales and sales growth, the highest metrics are most consistently delivered by the Norwegian company, Kahoot, which is a game-based learning and development platform. In light of and together with its high growth revenue forecasts, we view this as one of the closest comparators to VRE despite its size relative to VRE.

## VR Education Holdings

Figure 37 - Comparison metrics for VRE and selected peer comparators (as at 1 September, based on consensus forecasts – except VRE)

	Listing location	Market cap £m	EV/Sales (x)			Sales growth		
			CY1E	CY2E	CY3E	CY1E	CY2E	CY3E
Chegg Inc	USA	8757	14.4	11.8	9.8	24%	23%	20%
Frontier Developments PLC	UK	1116	9.2	7.0	5.8	42%	31%	21%
Kahoot ASA	Norway	2469	<b>32.3</b>	<b>17.3</b>	<b>12.4</b>	<b>192%</b>	86%	39%
Keywords Studios PLC	UK	2394	5.5	4.8	4.4	32%	14%	11%
Learning Technologies Group PLC	UK	1790	9.9	9.3	8.8	34%	7%	5%
Lincoln Educational Services Corp	USA	126	0.5	0.5	0.5	13%	7%	2%
LoopUp Group PLC	UK	22	1.0	0.9	1.1	-50%	11%	-18%
Stride Inc	USA	1041	1.0	0.9	0.9	12%	2%	5%
Sumo Group PLC	UK	839	17.0	8.1	6.7	58%	20%	17%
Team17 Group PLC	UK	1057	11.1	10.1	9.4	10%	10%	8%
Tribal Group PLC	UK	220	2.8	2.7	2.7	9%	3%	1%
Zoo Digital Group PLC	UK	119	3.6	3.0	2.7	21%	18%	12%
2U Inc	USA	2009	2.7	2.4	2.1	18%	16%	14%
<b>VRE</b>	<b>UK/Ireland</b>	<b>46.4</b>	<b>18.7</b>	<b>9.5</b>	<b>4.7</b>	<b>75%</b>	<b>96%</b>	<b>102%</b>
<b>Unweighted average</b>			<b>9.3</b>	<b>6.3</b>	<b>5.1</b>	<b>35%</b>	<b>25%</b>	<b>17%</b>
<i>VRE indexed to average (=100)</i>			202	151	92	215	391	599
<b>Median</b>			<b>7.3</b>	<b>5.9</b>	<b>4.5</b>	<b>23%</b>	<b>15%</b>	<b>11%</b>
<i>VRE indexed to median (=100)</i>			254	161	104	332	640	889
<b>VRE indexed to best in class (=100)</b>			<b>58</b>	<b>55</b>	<b>38</b>	<b>39</b>	<b>100</b>	<b>100</b>

Source: Refinitiv Eikon, Shard Capital

**VRE has second highest rate of sales growth within the peer group behind Kahoot**

The table shows that VRE has a higher rate of forecast sales growth compared with the peer group. VRE's sales forecasts of 75%, 96% and 102% equate to a three-year growth rate of 595%. This is the second highest cumulative three-year figure amongst the cohort behind only the 660% growth forecast for Kahoot over the period. VRE indexes strongly at an average 511 against the average/median figures for sales growth over the three-year forecast period. This reflects the ambitious growth targets laid out by VRE in its Medium-Term Outlook plan, published alongside its January 2021 trading update.

**VRE's EV/sales metric normalises on a three-year view to the average/median group rating**

This high rate of forecast revenue growth is reflected in its high EV/sales metrics, most notably for CY1E (2021E) and CY2E (2022E), where they stand at 18.7x and 9.5x respectively. On an indexed basis, VRE's rating stands at over 200 for CY1 against both the average and median ratings, namely more than double the value of the compco average and median ratings. In CY2, the indexed figure falls back to just over 150 against both the average and median, while in CY3 (2023E), VRE's indexed value stands at 92 against the cohort average ie lower, and 104 against the median, ie just 4% above. VRE's EV/sales metric of 4.7x in CY3E compares with the average figure of 5.1x and the median rating of 4.5x. This means that the EV/sales rating has normalised on a three-year view, implying the market is discounting the three-year sales projection path in the current share price.

**VRE stands on a significant EV/sales discount of 50% to the best in class of our compcos**

We have also benchmarked and indexed VRE's EV/sales metric against the best in class within the compco cohort, Kahoot. The index falls from 58 to 38 over the period, averaging 50 over the period. VRE stands on a significant discount of 50% to the best in class of our peer comparators on this sole valuation metric. This could arguably be viewed as a more reasonable comparator than to the average/median figures, given VRE's aspirations, growth targets and high and rising gross margins.

We remind investors that they should use their own views of the relevant risks and rewards when assessing and applying any valuation criteria. We remind investors also of the limitations of EV/sales as a standalone valuation metric, as outlined above.

# Risks

Figure 18 – Overview of risks and impacts thereof

Risk	Impact
<b>Adopter risk</b>	There remains a risk that educators and corporate trainers fail to adopt the ENGAGE platform, and/or choose to adopt a competing platform, resulting in materially lower revenues than forecast.
<b>Competition</b>	The VR and VR EdTech markets are seeing rapid growth with the potential for new entrants/competitors bringing advances to the market place, to which the group may fail to respond in a timely manner, and/or which may negatively affect its positioning.
<b>Content rights</b>	The group will endeavour to secure the content rights, waivers and clearance required to monetise its content. Failure to do so would have negative financial consequences.
<b>Content screening</b>	The group will screen posted content for offensive, inappropriate, radical or socially unacceptable content. Risk remains that some forms of content may be cause for offense resulting in negative publicity.
<b>Cost of platform development</b>	Management has made detailed cost forecasts, but unforeseen future development costs for the ENGAGE platform could have a material effect on the company's financial position.
<b>Data protection</b>	The group is bound by data protection and privacy rules in the jurisdictions within which it operates. A breach of data or failure to comply with regulations and laws surrounding data protection and privacy could damage the Group's reputation and potentially financial position.
<b>Key personnel</b>	The loss of key personnel could hinder the development of the group at a critical juncture. Given the high level of expertise within the group, the replacement of key individuals would be a lengthy and costly process.
<b>Penetration of VR hardware</b>	One of the driving success factors of the VRE proposition is the adoption and penetration of VR into the market. Failure of the market to reach forecasted penetration levels would have a material effect on the ENGAGE revenue proposition.
<b>Quality of connection</b>	The ENGAGE platform and experiences rely on high-speed internet connection. Failure of the user's connection to meet the required standard would result in a sub-optimal performance of the platform. Live streaming requires an uninterrupted connection. The lack of a high-speed uninterrupted connection, or failure to address technical issues, would result in sub-optimal performance and a negative experience.
<b>Reliance on licensing and supplier agreements</b>	The Group enters into various licensing and supplier agreements, such as its Unity license. Licence and distributor costs increases or the termination of such agreements could have a materially negative effect on the Group.
<b>Reliance on third party suppliers</b>	The group relies on third party suppliers for various functions, payment processing, server hosting and storage solutions. Failure of the supplier to meet technical or data protection and privacy rules may result in negative financial and reputational implications.

## VR Education Holdings

<b>Stage of operations</b>	VRE is moving into a new phase of its commercial development and revenue generation. To date, revenue has primarily been generated from the release of its Showcase Experiences. Going forward, this will shift to revenue generated through and by the ENGAGE platform, primarily via partnerships and revenue sharing arrangements with third parties. If these partnerships gain less traction than planned for, this would result in lower than forecast revenues and commissions for VRE.
<b>Technical risk</b>	The group relies on the proper functioning of its technology, hosting and equipment. In the event of outages and the loss of functionalities, the group could be negatively affected.
<b>Technology</b>	The technology market is constantly evolving. The group's technology could become obsolete or uncompetitive as the VR market develops.
<b>VR hardware providers</b>	VRE depends on third party hardware to deliver its platform. The actions of HMD providers, such market exit, dramatic price increases or supply shortages/disruption, could have a material impact on the group's prospects.
<b>VR hardware pricing</b>	HMDs and high specification PCs, which support VR applications, are recognised to be at a high price point. With hardware prices declining and becoming more affordable, adoption rates are forecast to increase significantly. Price points can impact the rate of mass adoption, presenting a potential hindrance to the addressable market size for the ENGAGE platform.
<b>5G adoption rates</b>	Telecommunication providers are looking to use VR as a means of upselling customers from 4G to 5G. The potential for the ENGAGE platform would be adversely impacted, were this initiative to gain a lower than expected level of traction with the customer base of telco companies.

Source: Shard Capital, VRE

## Board of Directors

### **Richard Cooper, Non-Executive Chairman**

Richard Cooper is the Non-Executive Chairman of VRE. Richard has over 25 years' experience as a Finance Director, in both publicly traded and privately-owned companies in a variety of service industries including gaming, insurance, and financial services. He has significant operations and M&A skills, with AIM, TSX and LSE official list technical experience and has extensive contacts in London City and in the Gaming sector.

### **David Whelan – Chief Executive Officer**

David Whelan co-founded Immersive VR education in 2014. He currently holds the position of CEO of VRE. David is the former Editor-in-Chief of Virtual Reality Reviewer and is co-founder of the Virtual Reality Awards. David is the multi award winning director of Apollo 11 VR. Prior to founding Virtual Reality Reviewer with Sandra Whelan, David was the owner and web developer of Whelan Web Design, providing web development services to small and medium clients from 2008 to 2014.

### **Sandra Whelan – Chief Operating Officer**

Sandra is the Chief Operating Officer and co-founder of VRE. Sandra is a former editor at Virtual Reality Reviewer and is the co-founder of The Virtual Reality Awards. Sandra was head of corporate accounts management at E-Drive Group Telematics for 6 years prior to co-founding Immersive VR Education in 2014 and moving full time into the business in 2015.

### **Séamus Larrisey – Chief Financial Officer**

Séamus Larrisey is the Chief Financial Officer of VRE, which he joined in 2017. He previously worked as a Senior Project & Management Accountant at Telecommunications Software and Systems Group ("TSSG") and as an Audit Manager at Ernst and Young, gaining significant auditing and accounting experience across several industries over a seven-year period.

### **Dr Harry Kloor, Non-Executive Director**

Harry is the CEO and Co-Founder of Beyond Imagination, a company seeking to build general-purpose robotic humanoids. Harry is involved in the education sector and has significant experience in bringing science to the public. He has worked as an advisor for NASA, US Senate, Jet Propulsion Laboratories, and numerous other science organisations. Dr. Kloor was also one of the five founding team members of XPRIZE, the non-profit organisation intended to encourage technological development to benefit humanity.

### **Tony Hanway, Non-Executive Director**

Tony is an experienced Senior Executive having worked on boards in five European countries. He is currently the CEO of Virgin Media Ireland and has been Chairman of TV3 since 2015. His previous roles included working as Chief Commercial Officer for Telefonica O2 Germany plc from 2013 to 2015, and as CEO of O2 Ireland from 2011-2014. Tony also served as the Chairman of the Irish Telecom and Internet Federation from 2013-2014.

### **Praveen Gupta, Non-Executive Director**

Praveen is currently VP of HTC Investments and Partnerships. He has gained a wealth of experience in corporate business development and M&A from previous roles such as VP Corporate and Business development at SK Telecom, Director at Lucent/Nokia and Executive Director and Partner at CDIB Ventures and management positions at Fujitsu-ICL Systems. Praveen joins the Board following HTC's strategic partnership with and investment in VRE.



## Major shareholders

The following table shows the major shareholders of the group from the corporate website as of 10 September 2021. With around a combined stake of around 27% in VRE held by directors and other employees, there is a strong alignment of the interests of the business with those of external shareholders.

Figure 19 – Major VRE shareholders as at 10 September 2021

Name	Number of shares (m)	% of share capital
HTC Corporation	48.28	16.6%
Octopus	43.62	15.0%
David Whelan	38.67	13.3%
Sandra Whelan	38.67	13.3%
Enterprise Ireland	19.00	6.6%
Unicorn Asset Management	18.98	6.5%
Barry Downes	13.05	4.5%
Canaccord	12.50	4.3%
Suir Valley Ventures	10.58	3.7%
Aviva	9.81	3.4%

Source: VRE, Shard Capital

## Glossary

Figure 20 – Glossary of terms

Term	Definition
<b>Avatar</b>	An icon or figure representing a particular person in a computer game, Internet forum, etc. (Oxford Dictionaries)
<b>Blended Learning</b>	Term used to describe a teaching method where students complete some of their classes online and the rest at a traditional bricks and mortar institute.
<b>Extended Reality (XR)</b>	An umbrella term encapsulating the whole spectrum of AR, MR and VR
<b>Field of View</b>	Angle of degrees in the visual field. The human eye's FOV is approximately 200°. Premium headsets are currently c110°, though some offer up to 210°.
<b>Haptics</b>	Tactical feedback which recreates the sense of touch via a controller in the VR environment.
<b>Head Mounted Display (HMD)</b>	Headset worn by the user as the portal to the VR/AR environment equipped with various tracking techniques to track physical movements such as rotational head tracking, positional head tracking, room scale tracking, eye tracking and gestural tracking.
<b>Interpupillary Distance (IPD)</b>	IPD tracks the space between the centre of a HMD user's pupils. Higher specification headsets allow user to change the IPD for a better view.
<b>ISV</b>	Independent Software Vendor
<b>Lag</b>	Refresh rate of the screen is too low or latency too high, creating a visual which does not keep up with what the brain expects to be viewing and can cause nausea.
<b>Latency</b>	Latency is the delay between action and reaction. Having low latency is crucial when using a Head Mounted Display for XR activities. Minimizing latency is one of the biggest challenges within XR, as the human brain can detect very small latency in the visual and audio systems.
<b>Massive Open Online Course (MOOC)</b>	An online course that enrolls thousands of students into a single online course, which include traditional course material such as filmed lectures, readings and problem sets, along with interactive user forums.
<b>Metaverse</b>	A virtual collective space or universe, such as ENGAGE Oasis.
<b>Mixed Reality (MR)</b>	Creates a space where physical and digital objects co-exist and interact in real time together by mixing real and virtual environments.
<b>Online Attended Virtual Learning (OVAL)</b>	The process by which students are able to attend classes remotely and educators and corporate trainers are able to create their own content for publication via Virtual Reality or Augmented Reality (VR/AR).
<b>SDK</b>	Software Development Kit
<b>Steam</b>	A digital distribution platform developed by Valve Corporation, which offers digital rights management (DRM), multiplayer gaming, video streaming and social networking services. By 2019, the service had over one billion registered accounts, reaching peak penetration of over 20 million concurrent users in April 2020.
<b>Unity</b>	Creation and Editing platform to script VR/AR experiences and games developed by Unity Technologies. The primary scripting language is C#, with JavaScript and Unity script also employable. A clear benefit of the platform is that it allows user creations to be functional across a wide variety of end hardware.
<b>Virtual Reality (VR)</b>	Replaces one's existing view of the world with a digital experience.
<b>360° Video</b>	Passive consumption of video which allows the user to look around a 360° video transporting the user to a new place. A 360° video is not a VR experience.

Source: Shard Capital, VRE

## Summary financials

Figure 21 - Profit and loss account and cash flow forecasts

Year to December	2018	2019	2020	2021E	2022E	2023E
<b>Turnover</b>	<b>0.716</b>	<b>1.025</b>	<b>1.417</b>	<b>2.485</b>	<b>4.879</b>	<b>9.842</b>
Cost of sales	(0.240)	(0.401)	(0.404)	(0.570)	(0.826)	(1.369)
Gross profit	0.477	0.623	1.013	1.916	4.053	8.473
Gross margin (GM) (%)	66.5%	60.8%	71.5%	77.1%	83.1%	86.1%
Operating costs	(2.247)	(2.555)	(3.734)	(5.343)	(8.295)	(8.956)
<b>Operating profit</b>	<b>(1.771)</b>	<b>(1.932)</b>	<b>(2.721)</b>	<b>(3.428)</b>	<b>(4.242)</b>	<b>(0.483)</b>
Operating profit margin (%)	(247.2%)	(188.6%)	(192.1%)	(137.9%)	(86.9%)	(4.9%)
Depreciation and amortisation	(0.225)	(0.494)	(0.655)	(0.609)	(0.447)	(0.048)
<b>EBITDA</b>	<b>(1.545)</b>	<b>(1.438)</b>	<b>(2.067)</b>	<b>(2.819)</b>	<b>(3.795)</b>	<b>(0.435)</b>
EBITDA margin (%)	(215.7%)	(140.4%)	(145.9%)	(113.4%)	(77.8%)	(4.4%)
Interest charge	(0.030)	(0.007)	(0.007)	0.000	0.000	0.000
<b>Pre-exceptional PBT</b>	<b>(1.801)</b>	<b>(1.939)</b>	<b>(2.728)</b>	<b>(3.428)</b>	<b>(4.242)</b>	<b>(0.483)</b>
Exceptional charges	(3.143)	0.000	0.000	0.000	0.000	0.000
Profit before tax	(4.944)	(1.939)	(2.728)	(3.428)	(4.242)	(0.483)
<b>Adjusted diluted EPS (p)</b>	<b>(0.009)</b>	<b>(0.010)</b>	<b>(0.011)</b>	<b>(0.013)</b>	<b>(0.015)</b>	<b>(0.002)</b>
Diluted EPS (p)	(0.026)	(0.010)	(0.011)	(0.013)	(0.015)	(0.002)
Dividend (p)	0.000	0.000	0.000	0.000	0.000	0.000
<b>Cash flow</b>						
Year to December	2018	2019	2020	2021E	2022E	2023E
Operating profit	(4.914)	(1.933)	(2.721)	(3.428)	(4.242)	(0.483)
Depreciation and amortisation	0.225	0.494	0.655	0.609	0.447	0.048
Inventory (increase)/decrease	0.000	0.000	0.000	0.000	0.000	0.000
Debtors (increase)/decrease	(0.156)	0.189	(0.153)	(0.018)	(0.311)	(0.383)
Creditors increase/(decrease)	(0.188)	(0.002)	0.165	(0.023)	0.073	0.060
Other	0.000	0.000	0.000	0.000	0.000	0.000
<b>Operating cash flow</b>	<b>(5.032)</b>	<b>(1.252)</b>	<b>(2.055)</b>	<b>(2.859)</b>	<b>(4.032)</b>	<b>(0.758)</b>
Interest	(0.030)	(0.007)	(0.007)	0.000	0.000	0.000
Tax	0.000	0.000	0.000	0.000	0.000	0.000
Dividends	0.000	0.000	0.000	0.000	0.000	0.000
Deferred tax	0.000	0.000	0.000	0.000	0.000	0.000
Capital expenditure	(0.052)	(0.036)	(0.013)	(0.025)	(0.025)	(0.025)
<b>Trading cash flow</b>	<b>(5.811)</b>	<b>(2.185)</b>	<b>(2.190)</b>	<b>(2.884)</b>	<b>(4.057)</b>	<b>(0.783)</b>
Acquisition of businesses	0.000	0.000	0.000	0.000	0.000	0.000
Disposal of businesses	0.000	0.000	0.000	0.000	0.000	0.000
Share issues	6.235	0.000	2.938	8.500	0.000	0.000
Currency effects, other	0.289	0.000	0.000	0.000	0.000	0.000
<b>Net cash inflow/(outflow)</b>	<b>3.382</b>	<b>(2.192)</b>	<b>0.740</b>	<b>5.591</b>	<b>(4.075)</b>	<b>(0.801)</b>
<b>Net (debt)/cash</b>	<b>3.485</b>	<b>1.293</b>	<b>2.033</b>	<b>7.624</b>	<b>3.550</b>	<b>2.748</b>

Source: Shard Capital, VRE

Figure 22 - Summary of balance sheet forecasts

<b>Balance sheet</b>						
<b>Year to December</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021E</b>	<b>2022E</b>	<b>2023E</b>
Tangible fixed assets	0.060	0.116	0.084	0.060	0.048	0.034
Intangible fixed assets	0.957	1.434	0.964	0.414	0.014	0.014
Investments and other	0.000	0.000	0.000	0.000	0.000	0.000
<b>Total fixed assets</b>	<b>1.016</b>	<b>1.550</b>	<b>1.048</b>	<b>0.474</b>	<b>0.062</b>	<b>0.049</b>
Stock	0.000	0.000	0.000	0.000	0.000	0.000
Trade and other debtors	0.394	0.205	0.358	0.376	0.687	1.071
Deferred tax	0.000	0.000	0.000	0.000	0.000	0.000
Cash and short term deposits	3.485	1.293	2.033	7.624	3.550	2.748
<b>Current assets</b>	<b>3.879</b>	<b>1.498</b>	<b>2.391</b>	<b>8.000</b>	<b>4.237</b>	<b>3.819</b>
<b>Total assets</b>	<b>4.895</b>	<b>3.047</b>	<b>3.439</b>	<b>8.474</b>	<b>4.299</b>	<b>3.868</b>
Trade and other payables	(0.195)	(0.193)	(0.357)	(0.335)	(0.408)	(0.468)
Borrowings	0.000	0.000	0.000	0.000	0.000	0.000
Other current liabilities	0.000	0.000	0.000	0.000	0.000	0.000
<b>Current liabilities</b>	<b>(0.195)</b>	<b>(0.226)</b>	<b>(0.396)</b>	<b>(0.349)</b>	<b>(0.418)</b>	<b>(0.473)</b>
Borrowings	0.000	0.000	0.000	0.000	0.000	0.000
Other non-current liabilities	0.000	(0.034)	(0.020)	(0.020)	(0.020)	(0.020)
<b>Non-current liabilities</b>	<b>0.000</b>	<b>(0.034)</b>	<b>(0.020)</b>	<b>(0.020)</b>	<b>(0.020)</b>	<b>(0.020)</b>
<b>Total liabilities</b>	<b>(0.195)</b>	<b>(0.260)</b>	<b>(0.417)</b>	<b>(0.370)</b>	<b>(0.438)</b>	<b>(0.493)</b>
<b>Net assets</b>	<b>4.700</b>	<b>2.788</b>	<b>3.022</b>	<b>8.104</b>	<b>3.861</b>	<b>3.374</b>

Source: VRE, Shard Capital

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