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NANOVEU LIMITED (NVU)

Adding a WOW factor to the digital device user experience

DIRECTORS

Alfred Chong, Executive Chairman & CEO
Michael van Uffelen, Executive Director & CFO
Steven Apedaile, Non-Executive Director
David Nicol, Non-Executive Director

IPO DATA

ASX Code:	NVU
IPO Issue Price:	$0.20
Amount to be Raised:	$4.5 mill (min) $6.0 mill (max)
Market Capitalisation:	$25.0 mill (min) $26.4 mill (max)

CAPITAL STRUCTURE

Issued Shares on Completion:	125.0 mill (min) 132.5 mill (max)

SHAREHOLDERS (max raise)

Vendors	68.4%
Convertible Note Holders	8.8%
IPO Investors	22.6%
Other	0.2%

SENIOR ANALYST

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INVESTMENT PROPOSITION

Nanoveu is harnessing advance optics technology to develop products which will markedly improve the mobile device user experience. It's first product promises to deliver a "WOW" factor to voracious consumers of mobile games and video entertainment, whilst its second product, which is in development, promises to deliver sharp images, especially for older users who are experiencing diminishing vision quality.

These products are unique with the company's technology relationships with Singapore's leading research institutions providing sustainable competitive advantage and barriers to competition.

The pool of mobile device users is very deep providing Nanoveu with considerable market opportunity. A comprehensive sales and marketing program will drive a rapid sales ramp-up of the EyeFly3D product over the next two years ahead of the anticipated launch of EyeFyx which will further propel growth.

Nanoveu is a speculative opportunity with a ready-to-go product. Medium to long term share price appreciation potential is considerable and will be driven by the achievement of sales targets, EyeFyx development progress and further product/technology developments.

KEY POINTS

- Nanoveu's core capability lies in applying micro optical lenses to functional solutions on mobile devices through the combination of hardware and software. The hardware is a uniquely designed array of micro and nano optical lenses on an ultra-thin substrate of plastic or glass which is layered on-top of the device; a screen protector with thousands of embedded nano-lenses. The software is an app which will manipulate the light from the screen pixels to control the functionality of the hardware.
- In harnessing these technologies, Nanoveu's products will greatly enhance the user experience with smart devices; EyeFly3D adds a "WOW" factor in viewing gaming, video and image content whilst EyeFyx will enable sharp viewing and correct focusing for the large cohort of the population which struggles with digital devices.
- Ready to launch EyeFly3D is a unique screen protector which will enable image, graphic and video content to be viewed in 3D on a smartphone or tablet without glasses and regardless of whether the content was produced in 2D or 3D. It has the potential to transform the user experience and increase the level of engagement.
- EyeFly3D will considerably enhance the viewing experience and with retail pricing comparable to an inert screen protector, it will will be a compelling purchase for the very large pool of veracious consumers of mobile gaming and video content.
- A proof of concept trial between 2013 and 2015 validated the product and the business model. Accordingly, the commercialisation strategy is multi-pronged and designed to drive rapid scale-up. A combination of online, multi-market distributor and white label/OE channels are expected to lead to a rapid build-up in sales. Sales are targeted to grow from 358,000 units in the first year post listing rising to 3 million units in year 2, at a wholesale price of $5 per unit.
- With annual mobile phone unit sales of around 1.8 billion, there is enormous room for EyeFly 3D to build significant volumes over several years.
- A second product, EyeFyx, is in development which will enable users to correctly focus on the screens and view the content sharply, without glasses. Age related far-sightedness (presbyopia) is a near universal condition experienced as we get older. EyeFyx is designed to correct for this condition. Whilst many people have reading glasses, they are often misplaced or unavailable but more significantly it's a condition which is also often untreated but for which the symptoms (blurred vison or lack of sharpness when reading) are evident. EyeFyx will be an easy, cost-effective solution.
- Nanoveu has gained considerable competitive advantage and established major barriers to competition through leveraging the technologies developed by various research institutions in Singapore, in particular, A*Star. The company continues to benefit from these relationships through access to scientists, laboratories and facilities as well as grant funding from the Government.
- The scale up strategy will be funded from capital raised through the IPO. No forecasts have been provided in the prospectus but data provided indicates that revenue is expected to rise from around $1.8 million in year one to around S$15 million in year two post listing.

BUSINESS OVERVIEW

Nanoveu Limited was incorporated in February 2018 to acquire Singapore based, Nanoveu Pte Ltd which was established in 2012 to further the development and ultimately commercialise a nanoimprint technology originally developed by A*STAR (Singapore's equivalent to the CSIRO) which enables fast prototyping.

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Nonoveu's first product is a screen protector for smartphones and tablets that allows viewing of clear, distortion-free content in 3D with the naked eye (ie without special glasses). This has been branded as EyeFly3D.

Building on the core technology behind EyeFly3D, Nanoveu is developing its "EyeFyx" technology, which aims to correct for presbyopia (age related far sightedness) for viewing smart devices using a similar combination of hardware and software to EyeFly3D. This technology has completed the proof of concept stage with hardware design and optimisation, and software development now underway.

The central objective of both the EyeFly3D and the EyeFyx platforms is to considerably enhance the experience for users of smartphones, which are now ubiquitous. EyeFly3D will add a "WOW" factor to viewing either 2D or 3D content (images and videos) on smartphones and has the potential to vastly improve the entertainment and gaming experience in mobile environments. The objective of EyeFyx is to correct focussing on devices and enable clear reading, without glasses for those with problems of far-sightedness, a common problem with ageing.

The EyeFly3D product comprises a clear plastic screen embedded with thousands of nano-lenses and software (a downloadable app). The protective screen protector is a low-cost, thin, sensitive and flexible sheet. EyeFly3D screens are available in Polyethylene terephthalate (PET)or Tempered Glass, and are oleophobic and anti-fingerprint.

Each smartphone/tablet requires a screen compatible with that model reflecting the unique specifications that the OE manufacturers build into their glass screens. Accordingly, pilot and proof of concept product was developed for the iPhone 4 and 5 models. Production is now underway for current iPhone models with availability for Android models due in early 2019.

In a pilot program, over 50,000 EyeFly3D screens were sold between 2013 and 2015, generating revenue of about S$675K, through distributors in the US and through a website. Funds raised through the IPO will be used, amongst other things, to scale up production and marketing. The company is targeting sales of 358,000 units in the first year post listing rising to 3 million units in year 2, at a wholesale price of $5 per unit. Retail pricing is expected to be comparable with existing screen protectors.

Nanoveu will also generate revenue from the software. A freemium model will be employed whereby the basic version of the software will provide limited functionality of the hardware (time limited access to the 3D capability in viewing videos) with a cost required to gain unlimited access to the functionality.

Nanoveu's commercialisation strategy is multi-pronged incorporating online direct to consumer via the company's own web site, Amazon, Alibaba and similar sites; wholesale distribution into mall kiosks,

mobile accessory retailers, big box retailers and home shopping networks; and White label /OE channels including 2nd and 3rd tier device manufacturers, telecoms, large distributors and other retail groups. A wholly owned subsidiary has been established in the US and salesmen have been hired in Taiwan to directly manage distribution into the US and Greater China respectively and key mobile phone accessory distributors have also been identified in India, Middle East, ASEAN and South Africa.

Nanoveu's prospectus does not include any forecasts, however, based on the targeted sales volumes and the wholesale price, revenue in the first year following listing is indicated to be in around of $1.8 million rising to about $15 million in the second year.

THE TECHNOLOGY

A*STAR's *Institute of Materials Research and Engineering* worked with Temasek Polytechnic to develop the prototype for EyeFly3D, a nanoimprint-based screen protector that allows viewing of clear, distortion-free 3D content with the naked eye. In March 2013 the A*STAR Intellectual Property behind EyeFly3D was licenced to Nanoveu. Nanoveu further developed the Intellectual Property to create the EyeFly3D product.

Nanoveu has continued to work with and enjoy the support of A*Star with its office and facilities located in A*Star's technology hub with continuing access to staff and laboratories, which would not otherwise be affordable by a company of Nanoveu's current size.

More recently, Nanoveu has been collaborating with the Nanyang Technological University, another leading research institution in Singapore, in the development of EyeFyx. Nanoveu has secured in-principle funding of S$967,200 from the Singapore Government's Industry Alignment Fund to collaborate with NTU on the EyeFyx project.

Through these relationships, Nanoveu has been able to harness considerable skills and resources to fund and support the development of its products which it is now seeking to commercialise. Accordingly, these relationships are a source of competitive advantage and a significant barrier to competition given the considerable cost and time that would be required to achieve a similar commercial outcome.

Nanoveu's EyeFly3D, uses a combination of software (app) and hardware (screen protector) to offer real time, affordable and easy to use 3D rendering and 2D-to-3D instant conversion of videos and photos on mobile devices – without the use of 3D glasses on smartphones and tablets.

Each mobile device model requires a unique design of the lens array to be compatible with the specifications of the underlying glass and operating platform of that device. These designs are made by Nanoveu in house with prototypes produced by A*STAR.

The hardware (screen protectors) is manufactured using a relatively new process, Nano Imprint Lithography which is an advanced patterning technique effective for sub-100 nanometre applications. This process is compatible with either stiff or flexible substrate materials, particularly silicon, glass, or plastics and is ideal for fabricating optical components. The app has been developed by Nanoveu.

Nanoveu's complementary EyeFyx technology involves hardware and software aiming to correct images for vision aberrations on high resolution digital devices, such as smartphones and tablets. The proof of concept has been achieved and work is now progressing on optimisation of the hardware (the screen protector) and software development. Manufacturing of the screen protector will be via a similar process as used for EyeFly3D.

BUSINESS DRIVERS AND GROWTH PROFILE

Since Apple launched its iPhone in 2007, the smartphone has become ubiquitous with an installed base today of nearly 3 billion and annual sales of about 1.8 billion units. The smartphone and more recently the tablet have transformed our lives. Whereas the mobile phone experience was overwhelmingly about mobile voice and text communication between two parties, smart devices are about entertainment, social engagement, access to news and information and maybe old-fashioned phone calls as well. But essentially these smart devices have become indispensable tools for managing and engaging with the world on multiple levels.

Smart device technology has made considerable advances over the past 11 years. In addition to processing power and capability, OE manufacturers have put enormous efforts into improving the quality of the glass screen and the in-built camera. As a result these devices today produce high quality images and video with a very high quality viewing experience. Nonetheless, development continues to progress on further enhancing the user experience.

Around 2010, 3D was all the rage. Hollywood was producing a large volume of 3D content and the TV manufacturers were adding 3D functionality to their screens. But the craze soon faded and 3D functionality has all but disappeared from TV screens. Consumers were far from taken with the technology with the required glasses, which proved to be a nuisance, and lack of compelling content, being major barriers that could not be crossed.

In 2011 and 2012, Sharp and LG, as well as a number of other smaller OE manufacturers, launched 3D enabled smartphones which had the advantage of not requiring glasses. These were generally launched in limited markets in Asia and met with varying degrees of success. After this initial flurry, there have been few other entries into this market which has all but been ignored by first tier manufacturers. Nonetheless, development is still occurring and broad market acceptance in a smart device may still occur. It has been argued that a key missing driver has been the lack of content including videos and games.

A screen protector which enables 3D viewing of images, games and videos is a low cost, low risk purchase for greatly enhancing the viewing experience. The ability of EyeFly3D to turn 2D content, be it a 2D image, game or video, into a 3D experience will be a very attractive, low cost proposition. This will most likely stimulate development of 3D content which will further drive demand. In contrast to the earlier experience with cinema and TV which failed as mass market concepts, in the mobile environment, with a low cost, user friendly, platform such as EyeFly3D, the 3D market could develop as a sizable sub-market. Nanoveu's second year production target of 3 million units is a tiny share of the global screen protector market, let alone the total device market and would be appear to be readily absorbable based on the strategy of pricing in line with an inert screen protector.

Whilst smart devices have become a major tool for absorbing entertainment for vast numbers of people, for a large cohort of the population, the user experience, especially reading, has been severely limited due to eyesight problems. Glasses certainly address this problem, however many people have reading glasses only and don't wear them constantly and often encounter problems when the glasses are not readily available, for whatever reason. Further, a significant proportion of the population have undiagnosed eyesight issues. Against this background, EyeFyx has the potential to considerably enhance the user experience in reading emails, online newspapers, books and other written content.

Age related far-sightedness (presbyopia) is a near universal condition experienced as we get older. It is estimated that over 80% of the population in west Asia, Europe, North America and Australia have functional presbyopia. The key symptom of presbyopia is the inability to correctly focus at reading

distance resulting in blurred vision. This is obviously problematic in viewing smart devices. The objective of EyeFyx is to enable an app, working with an imprinted screen protector, to present the user who needs corrective eyeglasses with a clear image on his smart device without wearing those glasses. Commercial release maybe 2 years away, subject to completion of hardware optimisation and software development, but EyeFyx will be well positioned to fill a major gap in a potentially huge market as a solution to significant unmet need.

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