PITT STREET RESEARCH

Weebit Nano Ltd.

Valuation update: $4.75 per share

Share Price: A$2.93

ASX: WBT

Sector: Technology Hardware & Equipment

14 January 2021

Weebit Nano (ASX:WBT) recently raised $15m (before costs) through an institutional placement and a Share Purchase Plan (SPP). Combined with the raise in mid-2020 and assuming a quarterly cash burn of $1.2m, we believe WBT now has a comfortable cash position of around $19m per 1 January 2021.

Following the raise and the fact that there are nearly 44m deep in-the-money options outstanding that can bring in an estimated $20m in funding, we believe the company is now substantially de-risked from a funding point of view.

The current funding situation should allow WBT to not only accelerate the existing development programs around the embedded memory module and the stand-alone device, it should also allow the company to start making some investments into research around neuromorphic computing architecture. This will open up another avenue of opportunities in due course.

Commercialisation: 6 months behind BrainChip

ASX-listed BrainChip (ASX:BRN) recently signed a commercial license agreement with Japanese semiconductor manufacturer Renesas for BrainChip's Akida 1.0 neural network IP. The agreement is for a single use design licence and ongoing royalties based on units sold. In addition, there is an implementation support fee, also known as non-recurring engineering (NRE) fees.

We believe this agreement is quite standard and typical for the semiconductor industry, and any license deal WBT were to make would likely be very similar in nature. WBT recently reaffirmed that it expects to ink its first commercial deal by mid-2021, which would put it around 6 months behind BrainChip.

Valuation of A$4.75 per share

When valuing WBT we have taken the same approach that we took when valuing BrainChip at $0.43 in mid-2019 when it was trading at $0.04, i.e. we believe the company should be valued in line with what the industry is willing to pay for similar semiconductor IP companies.

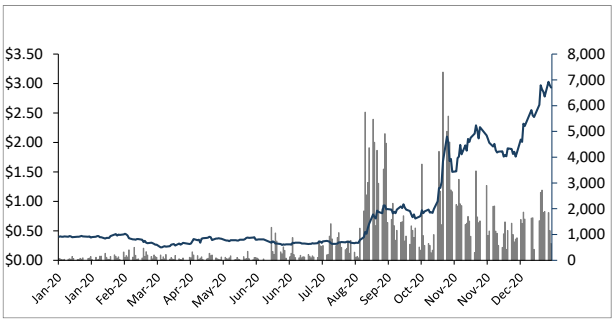
Given the expectation of WBT being able to sign a commercial deal for the embedded ReRAM module by mid-2021, we believe the company should be valued around $750m, or $4.75 per share on a fully diluted basis.

Please see page 4 for an overview of key investment risks.

Market Cap. (A$ m)	342.2
# shares outstanding (m)	116.8
# share fully diluted	157.8
Market Cap Ful. Dil. (A$ m)	462.4
Free Float	100%
52-week high/low (A$)	$3.19 / $0.20
Average daily volume (x1,000)	885
Website	www.weebit-nano.com

Source: Company, Pitt Street Research

Share price (A$) and avg. daily volume (k, r.h.s.)



Source: Refinitiv, Pitt Street Research

Valuation metrics	
Valuation per share (A$)	4.75 (was 1.36)

Source: Pitt Street Research

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Disclosure: Pitt Street Research directors own shares in Weebit Nano Ltd.

Capital raise accelerates development and commercialisation

WBT recently raised $12m (in November) through an institutional placement and $3m (in December) through a Share Purchase Plan (SPP) for existing investors. Both were done at $1.70 per share, substantially higher than the previous raise back in June at $0.28 per share.

Estimated cash position of $19.2m per 1 January allows for expedited development, qualification and commercialisation

Interestingly, WBT received interest for nearly $20m in the SPP and had to substantially scale back all applicants, given the size of the SPP was only $3m. We believe this scale-back has resulted in a strong aftermarket subsequent to the SPP closing on 18 December.

Assuming a quarterly cash burn of around $1.2m, we believe the November/December raise has now set the company up with a very strong, estimated, cash position of around $19.2m per 1 January 2021.

Deep in-the-money options to bring in an additional $18.5m

Additionally, there are 41m listed options outstanding with a strike price of $0.45, i.e. they are deep in-the-money and will likely be excercised sooner rather than later. This would bring in an additional $18.5m, further strengthening WBT's financial position. There are also approximately 12m unlisted options with excercise prices ranging from $0.23 to $1.71 which will bring in additional funding in the next several years. Overall, WBT's financial position will facilitate an accelerated development and commercialisation roadmap.

We especially like the accelerated process qualification ahead of a technology transfer to a third party fab to address the embedded memory market.

Additionally, in the last few months WBT has been able to expand its executive team with Ilan Sever as Vice President of Research & Development and Eran Briman as Vice President of Marketing and Business Development.

WBT appoints Adesto founder as CTO

More recently, WBT announced the appointment of Ishai Naveh as Chief Technology Officer (CTO), which we believe is a major step for WBT. In 2007 Mr. Naveh founded Adesto, an early ReRAM pioneer that was acquired by Dialog Semiconductor early last year. Prior to founding Adesto, Mr. Naveh worked on Non-Volatile Memories (NVM) at Tower Semiconductor. We believe his appointment is further proof that WBT is able to attract the highest calibre people on its journey to commercialise its SiOx ReRAM technology.

Neuromorphic computing can be the next big thing following embedded and discrete ReRAM devices

Lastly, we expect WBT to be able to do some more research around neuromorphic computing architecture, which is an area that ReRAM should be very well suited for. If and when WBT is able to develop a viable product in this area, which will likely take 3 to 5 years, it could be active in the same space as BrainChip (ASX:BRN). However, we believe BRN is well ahead of WBT in neuromorphic computing.

Additional patent filings create shareholder value

On 21 December 2020 WBT announced the filing of two patents together with development partner Leti. The first filing centers around improvement of the production process of memory cells in order to increase yield. The second patent filing focuses on selector development aimed at reducing power consumption in stand-alone memory devices.

Back in August 2020, WBT and Leti filed a patent around multilevel storage in ReRAM cells. Multilevel storage is currently commercially done in Flash memory where up to 3 bits per cell can be stored. In ReRAM, having multiple resistance levels in a single cell would allow for similar increases in storage

capacity. These ongoing patent filings, which increase WBT's patent portfolio, create additional shareholder value given that it is likely to increase the attractiveness of WBT to larger industry players as they seek to expand their IP (Intellectual Property) base with ReRAM-specific IP.

WBT is substantially de-risked following the cap raise

Our previous valuation for WBT was $1.36 per share. However, following the recent capital raising, the uncertainty around the company's funding has now been substantially reduced. In turn, we believe this has substantially reduced the investment risk for WBT. Additionally, helped by the enlarged financial runway, the company is now in a position to accelerate its various development programs, which increases the chances of WBT being able to address multiple markets in due time. In other words, the chances that the company can actually address the multiple commercial opportunities out there have greatly increased.

We valued BRN at $0.43 based on industry transactions

When it comes to valuing ASX-listed semiconductor development companies such as WBT, we have previously taken the approach of assessing what the industry is willing to pay for semiconductor IP in the various subsegments.

We valued BrainChip at $0.43 per share in 2019, based on industry transactions

When we valued BRN in May 2019, we took the view that the take-over prices that Intel was paying for similar, unlisted, companies should be a guide to how much BrainChip could be worth. At that time, we looked at Intel's acquisitions of Nervana Systems and Movidius in 2016, both done at around US$400m (~A$600m). Neither company had done any commercial deals at the time. Nervana Systems was active in hardware-based neuromorphic computing while Movidius was developing ultra-low power vision processors for computational imaging and vision processing for use in industrial and consumer electronics. We argued that on that basis, BrainChip should be worth around A$0.43 on a fully diluted basis.

Following its recent announcement of a commercial deal with Renesas, BrainChip has been trading between $0.40 and $0.45 per share, or a market capitalisation of approximately $750m at the midpoint, before rising further to $0.57 per share currently. Please see our report at https://www.pittstreetresearch.com/brainchip for a full analysis of BrainChip.

New valuation for WBT of $4.75 per share

Fair value of $750m, or $4.75 per share (was $1.36)

When we follow the logic above when it comes to valuing WBT, i.e. the company should be valued around $750m, which is inline with past industry deals and based on the expectation that it will sign a commercial deal in the near to medium term, we arrive at a value per share of $4.75 on a fully diluted basis ($1.36 previously).

WBT recently reaffirmed that it expects to be able to sign a commercial deal for the embedded memory module by mid-2021. This would put it around 6 months behind BrainChip when it comes to first commercialisation.

In conclusion, we believe there is substantial upside left for WBT, even following the strong share price run in the last 6 months. We expect the company to increasingly come on the radar screens of more institutional investors, while an announcement of a commercial deal would take away a lot of the risk around viability of the technology.

Please go to https://www.pittstreetresearch.com/weebit-nano for all our research coverage on WBT.

Key investment risks

- Although WBT is getting closer to commercialisation, the company is still in the development stage of its technology, and hence there is a risk that the potential of WBT's technology may not eventuate.
- Alternative emerging memory technologies are being developed by WBT's competitors. These technologies could potentially be superior in nature and/or could be commercialized sooner than WBT's technology, which would inhibit the company's future growth. However, apart from 4DS Memory (ASX:4DS), we don't see the other ReRAM players (Crossbar and Adesto) as potential competitors. Crossbar seems to have "evaporated" with no significant business activity in the last 18 months, while Adesto was acquired by Dialog for an EV of US$500m (A$758m at the time), specifically for its IP in the Internet of Things (IOT) space. Its ReRAM technology is only used internally and not licensed out at this stage.
- Although WBT now seems adequately funded for the medium term, there remains a risk that the company will need to raise further capital, for instance if its current development programs take longer than currently anticipated, resulting in dilution for existing shareholders.
- There are currently 41m in-the-money options overhanging the market, which have only been issued very recently (July 2020). Therefore, the holders of these options are sitting on a very substantial paper profit and may be inclined to take profits soon. If and when these options are exercised, we believe the 41m newly issued shares will likely be sold soon after exercise.
- COVID-19 is still posing a risk to WBT's research partner Leti in France as new lockdowns may be needed to stem the renewed increase in the rate of infections in France. Additionally, the inability to travel is posing challenges to WBT's technical and commercial people in its conversation with partners and prospects, which may slow down development and commercialisation.

Please refer to www.pittstreetresearch.com for our initiating coverage report on WBT, including more elaborate risk assessments.

Appendix I – SiOx ReRAM technology

ReRAM technology: The right balance between Flash memory and DRAM

ReRAM is a fast, cost-effective and energy-efficient non-volatile memory (NVM) technology. It can be considered a hybrid memory technology, as it is non-volatile like Flash memory and nearly as fast as DRAM, which is volatile, i.e., a DRAM cell will lose the value (1 or 0) that is stored if the power is switched off. WBT is developing SiOx ReRAM, which, in terms of performance metrics, sits right between Flash and DRAM.

How does it work?

Generally, in case of NAND Flash memory, the values of 1 and 0 are attributed on the basis of the trapped electrical charge present in the memory cell's floating gate. However, in case of a ReRAM cell, the values (1 and 0) are attributed based on the resistance level of the cell material sandwiched between the two electrodes (Figure 1). A value of 1 is attributed to a state of low resistivity, while a value of 0 is attributed to a state of high resistivity.

There are two ways of changing the resistance level of a ReRAM cell.

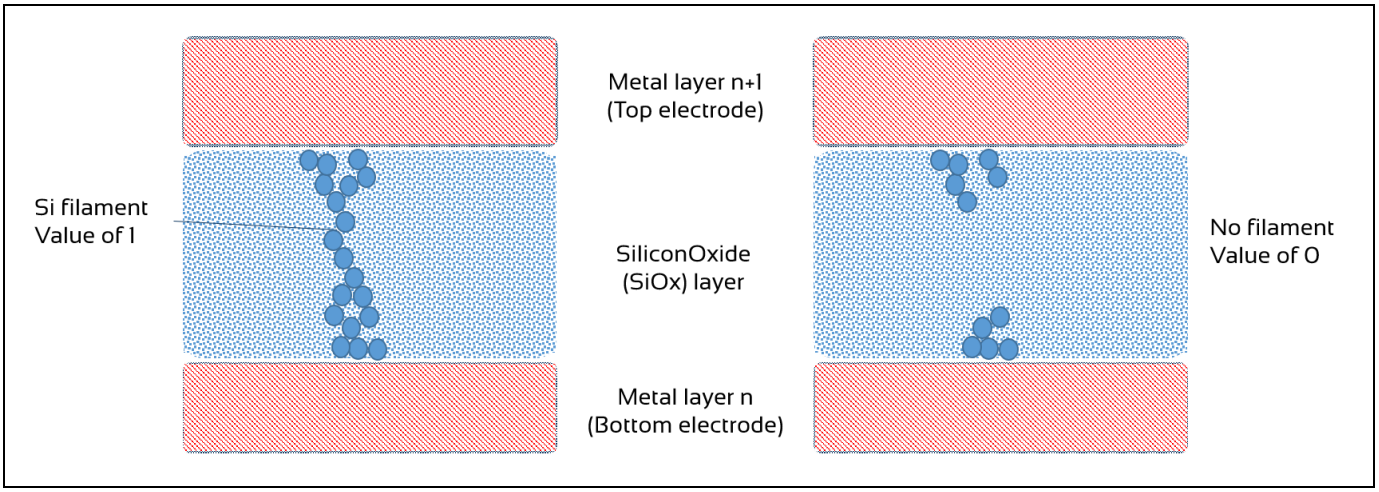
i) Through interface switching, which changes the resistivity of the entire layer between the electrodes or

ii) By creating a filament that connects the two electrodes.

WBT uses the latter.

The technology WBT is developing is based on the forming of a conductive channel between the two metal electrodes of a ReRAM cell. These electrodes are typically made of metals, such as titanium, tungsten, aluminium or copper. The conductive channel is formed inside a non-conductive SiOx layer.

Figure 1: Cell switching by forming and breaking a silicon filament in a SiOx switching layer



Source: Pitt Street Research

SiO_x has typically been used as an insulating component in semiconductor manufacturing. However, by applying a certain voltage to one of the electrodes, a switchable conductive pathway of silicon nanowires (filament) can be formed within the SiOx layer (Figure 1). In this high-conductivity, low-resistance state, the cell value is 1. By subsequently applying a reverse voltage

to the electrode, the filament can be broken down again, effectively switching the memory cell back to the original state of 0.

The actual filament is formed as the applied electrical voltage strips away some of the oxygen atoms in the SiOx layer, leaving the silicon atoms to cluster and form a conductive silicon pathway to the other electrode. The filament is ~5 nanometer (nm) to 7nm in diameter.

WBT uses SiOx in its ReRAM cells, a material that is well understood by the semiconductor industry and has been used in chip manufacturing for decades. We believe that the industry's familiarity with SiOx is a key factor in driving the adoption of WBT's technology among both semiconductor design houses and foundries.

SiOx ReRAM's technical parameters validate its commercial use

The endurance and retention levels demonstrated by WBT's technology open up many commercial opportunities

The key parameters for any non-volatile memory are retention and endurance. As demonstrated in the tests conducted by WBT's research partner Leti in May 2019, the company's ReRAM technology is at the forefront of the ReRAM market. The tests demonstrated data retention of over 10 years at 130–150°C, and endurance of a million cycles. Notably, these endurance levels are significantly higher than today's state-of-the-art Flash memory technologies.

Moreover, the retention levels that were achieved at these high temperatures have broadened the scope of potential commercial applications wherein WBT's technology can be used, including the most notable addressable market of electric vehicles.

Additionally, prospective customer XTX has independently verified and validated WBT's technology as well, providing sufficient validation of the technology, in our view.

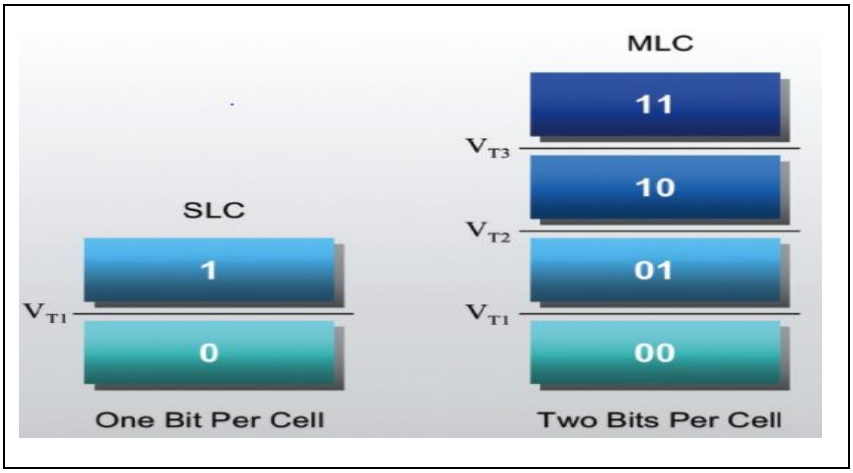
Appendix II – MLC technology

MLC technology: Putting more data in the same cell is another way to increase density

Traditionally, memory cells had two possible states, 1 and 0, and therefore could contain 1 bit of data. These cells are termed as single-level cells (SLC). However, now MLCs are available wherein the stored charge can be a variety of values and 2 bits of data can be stored in a single cell (Figure 2). MLC technology thus allows more data per unit of area to be packed onto a chip compared to SLC.

Typically, the cycling endurance and reliability required in end-user applications determine the appropriate storage technology to be used. SLCs have lower power consumption and therefore a longer lifespan compared to MLC (~100,000 cycles for SLC versus ~10,000 for MLC). Owing to higher reliability and faster speeds, SLC can be found in high-end storage applications, including data center storage. However, MLCs are less expensive to manufacture per unit of storage and this makes MLC Flash the most commonly used Flash, especially in consumer electronics such as mobile phones, cameras and tablets.

Figure 2: Relative voltage levels for SLC and MLC



Source: Pitt Street Research

Appendix III – Analyst Certification

Marc Kennis, lead analyst on this report, has been covering the Semiconductor sector as an analyst since 1997.

- Marc obtained an MSc in Economics from Tilburg University, Netherlands, in 1996 and a post graduate degree in investment analysis in 2001.
- Since 1996, he has worked for a variety of brokers and banks in the Netherlands, including ING and Rabobank, where his main focus has been on the Technology sector, including the Semiconductor sector.
- After moving to Sydney in 2014, he worked for several Sydney-based brokers before setting up TMT Analytics Pty Ltd, an issuer-sponsored equities research firm.
- In July 2016, with Stuart Roberts, Marc co-founded Pitt Street Research Pty Ltd, which provides issuer-sponsored research on ASX-listed companies across the entire market, including Technology companies.

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