

A large, stylized graphic in the top left corner consisting of three vertical bars of varying heights, with the tallest bar on the left and the shortest on the right, all in a light blue-grey color.

#2018

INFOCUS:



A better future

– when technology contributes towards
a sustainable society



The more technologically advanced our society gets, the faster the development and this fuels the continuing consumer demand for newer technology - we want the latest mobile phones, laptops, tablets, watches, cameras, toys and so on.

Technology and electronics are often associated with overconsumption, ever increasing electronic waste and a detrimental impact on the environment. But today we are seeing that advancements in technology are also contributing towards building a more sustainable, resource-efficient society for the future.

Throughout history, technology has contributed to many positive developments, ranging from the development of the wheel to helping to build and sustain our modern economies where the use of technology is now a prerequisite for today's daily life. The technological benefits enjoyed by an increasing number of the world's population would not be happening without such development. Having said that, we have also witnessed how pollution and continued use of our planet's limited resources have increased hand-in-hand with these technological developments. The more technologically advanced our society gets, the faster the development and this fuels the continued consumer demand for newer technology - we want the latest mobile phones, laptops, tablets, watches, cameras, toys and so on. Consumption drives further development and vice versa.

A POSITIVE IMPACT IN MANY AREAS

"Considering this along with the increasing focus on sustainability and our environmental impact, it is easy to paint a negative picture, as many do, of technology's impact on society. However, we have seen clear indications of a change, a strong shift away from the negative effects on the environment. Instead, technology is increasingly being seen as having an important role to play as a positive driver for creating a more sustainable world, environmentally and for society as a whole," says Chris Nuttall, Chief Operations Officer for the NCAB Group.

Whilst Chris Nuttall doesn't deny that technology does have negative effects, such as increased consumption, higher emissions and excessive use of resources, he believes that it is an important component towards building a better and more sustainable future. He points to the role of technology in fields such as medicine, citing as an example, the use of AR (Augmented Reality) in complex surgical procedures, or in agriculture, where drones may replace traditional tractors to enable 24/7 use and precise use of available land to maximize efficiency, or where enhancement of the nutrient contents in crops is being developed to help reduce the number of malnourished or undernourished people on the planet.

"Those of us involved within the technology industry should recognize the positive role that it can play and take some level of pride that we are part of it," says Chris Nuttall.



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CHRIS NUTTALL, CHIEF OPERATIONS OFFICER, NCAB GROUP

INTELLIGENT DIGITAL MESH

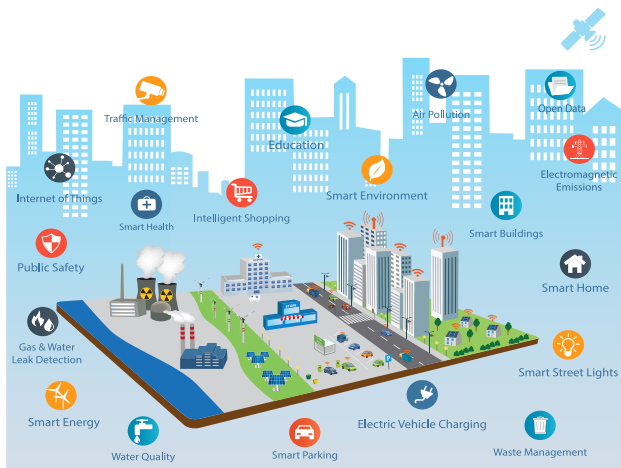
What is behind much of the development is the intelligent digital mesh trends. It is essentially the entwining or meshing of the human element, devices and digital services. We see that the previously distinct boundaries between the physical and digital are becoming increasingly blurred.

The 'Intelligent' aspect of the trend relates to AI or autonomous systems that are changing how we interface with electronics. We are seeing advanced learning along with a new class of rapid intelligent data collection that will solve challenges on a global scale.

When looking at the 'Digital' aspects we are talking about being immersed digitally in an enhanced and connected environment. Intelligent applications running on intelligent machines will be able function without constant human control.

"Examples of this at the design phase include working in a virtual or augmented reality environment, where we create a digital twin (simulation engineering using AI) to help reduce consumption of resources and speed up engineering development. By first building things virtually, we can run simulations to predict failures, and if failure occurs we can adjust in the digital model and re-simulate. This enables us to get much more of the product design and development work completed in a much shorter time before we need to start building it physically," he says.

Already today, physical product testing doesn't start until simula-



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tions have been run and re-run in a process that would have previously taken thousands of hours of virtual testing and data modelling. That is what, for example, Boeing or General Electric does when developing their engines.

Artificial intelligence itself is not new, it has been around us since the 1950s with the Turing test and John McCarthy's coining of the phrase as he described the science and engineering of intelligent machines. Many of us experience some level of AI everyday with services like the virtual assistants Alexa and Siri where we have moved from a one-way interaction to a two-way interaction, and we have users interacting with electronics and the electronics interacting in return with the users.

"When we start putting together all this in immersive platforms, such as AR or VR, pretty soon we will remove the problem of distance. On the medical side you could have the potential (reliability and speed of connection permitting of course) for world's greatest surgeons able to carry out remote surgery from the other side of the globe. Looking at ourselves, NCAB Group could use the same technology to enable both our customers and colleagues to 'visit' our factories or attend improvement meetings with our Factory Management team in China, without having to leave the office every time we wanted to 'see' something. The world is shrinking," says Chris Nuttall.

SECURITY AND ETHICAL CHALLENGES

Technology is making it easier to connect with people, easier to communicate or share data, to develop quicker through instantaneous interaction. The resulting expanding number of connections and transactions require greater levels of security and this is the 'Mesh' aspect of the trend. This will affect people, technology, business and social environments, as without security and control there would be too much risk to 'available' data.

"Issues about the management of cyber security and risks are becoming higher priorities. Blockchain technology and event-driven encryption, [which is] basically Romanesque transactional cryptol-

ogy on a digital level, can play important roles here. Regulations like GDPR also underline the importance managing all data that are made available responsibly," says Chris Nuttall.

Nevertheless, as technology progresses, he maintains that the major challenges will be ethical. There are crucial and in some cases, difficult issues to tackle, he says, both in terms of where to draw the line, as well as how and to whom the achievements of technology are made available, and continues: "For example, it may be possible to cultivate human organs, but what road do we then follow? Do we start playing God and who makes the decisions? And will the benefits only be made available to those who can afford it? Yes, there'll be regulations and demands to meet, but by far the biggest challenges will be ethical."

CHANGES FACING THE PCB INDUSTRY

What effect will technology advances have on the PCB industry? The end products are becoming increasingly complex and this is likely to continue based upon the larger technology trends. Products will need to be smaller and will be expected to do more. All that means that the boards must be made both smaller, yet contain more complexity, which requires changing our production processes.

"We will put much more on the boards and it will be much closer together. More active and passive components will be built into the boards. We are seeing this now albeit in smaller volumes so while the pace of change regarding such advances being commonplace may be slow, it will pick up. I think that the next five years will be interesting

EXPLANATIONS TO ABOVE EXPRESSIONS

AI: Artificial intelligence, programs that work and react similarly to humans or that area of computer science that examines human thought processes and attempts to duplicate them. Through intelligent machines, AI systems can write and even improve their own algorithms.

AR: Augmented Reality, a technique that overlays the perceptions of the human mind with computer-generated content in real time. With the help of interactive glasses or the like, the real outer world, which our eyes, ears and other sensory organs take in, is enhanced by virtual elements. The technology is similar to VR, but mixes digital with true emotions.

Blockchain: is a distributed database, containing digital records called blocks. Each node - in order to make it impossible to falsify information - has to automatically validate changes and additions made to any of the other nodes. Each computer on the chain gives its electronic signature. The original block chain is the basis for the electronic currency bitcoin.

GDPR: General Data Protection Regulation, is a new European Union Law drafted to strengthen and harmonize the protection of personal privacy in managing personal data within the EU. The law came into force across the EU on May 25 2018.

VR: Virtual Reality, is a form of computer technology that creates the illusion of reality in an interactive environment. Special glasses and headphones worn by a person and containing head movement sensors and display, immerse the user in a three-dimensional world that they can move about in and influence, using for example, hand controls.

Sources: IDG:s IT-Wordbook on the net, Wikipedia, Swedish Data Protection Authority, TechTerms, Techopedia



General Data Protection Regulation, is a new European Union Law drafted to strengthen and harmonize the protection of personal privacy in managing personal data within the EU. The law came into force across the EU on May 25 2018.



"There's no way of getting around that our world is driven by our customers. We can't pick and choose those customers. But we are proud to contribute to a wide range of end products that have a positive impact. These include, for example, technology for wind turbines, smart metering systems, charging stations for electric and hybrid vehicles, says Chris Nuttall.

times for the PCB industry. The way we build and populate a board will be challenged and possibly reinvented," says Chris Nuttall.

He points out that what is happening now is a continuation of developments that have been going on over a long period. What was complex and advanced five years ago - HDI, for example - is today certainly a lot more common to the point of being almost standard.



A new machine is being installed at Suntak, one of the factories NCAB's partner factories. The trend towards more complex PCBs places greater demands on us. It's vital we make sure our factories are aligned to this - otherwise we will miss out," says Chris Nuttall.

"This places greater demands on us. NCAB Group does not have its own R&D laboratories or departments, but we do monitor the technology horizon to see what is coming closer and closer, to understand what's around the corner. At the rate at which things are developing, that corner is coming ever closer. It's vital we make sure our factories are aligned to this - otherwise we will miss out," says Chris Nuttall.

TECHNOLOGY THAT SAVES LIVES

When it comes to the positive differences that NCAB's contribution might be making in the field of technology, Chris Nuttall is quick to emphasize that it's very much dependent on the market, in other words, on NCAB's customers.

"There's no way of getting around that our world is driven by our customers. We can't pick and choose those customers. But we are proud to contribute to a wide range of end products that have a positive impact. These include, for example, technology for wind turbines,

smart metering systems, charging stations for electric and hybrid vehicles.

"The thing I am most proud of is equipment to support localized blood heating for emergency transfusions. The blood has to be stored cold, but then heated before transfusion, which in emergencies can be a problem and delay the transfusion. There's no delay with this new product, as it rapidly warms the blood to the correct temperature at the time of the actual transfusion.

"Here our PCBs help to make a difference and save lives in first response situations on the scene. Such a simple idea and it's the simplicity that makes it so valuable. This applies to a lot of the technology that contributes to a better world. Someone looks at a problem from a new angle and gets that simple idea that make you ask why we didn't we do this before," he says.

"What would make a positive difference is to take more consideration of the product lifecycle after it is sold to the end-user. "

CHRIS NUTTALL, CHIEF OPERATIONS OFFICER, NCAB GROUP

WANT TO BE BETTER AT RECYCLING

What measures can NCAB and other players in the PCB industry take towards strengthening their positive impact and reduce the negative? Chris Nuttall sees recycling as an area where there is great deal of room for improvement.

"The general attitude is consumer oriented. It leads us down avenues where we are exposed to lots of things that we "have to" have. What would make a positive difference is to take more consideration of the product lifecycle after it is sold to the end-user.

"I feel that legislation has an important role to play in this respect. In Japan, manufacturers are responsible for recycling their used products, which influences the process all the way back to its initial stages.

"In this scenario, the owner of the design incorporates ease of recycling as a factor when shaping a product right from the start, on the drawing board. I think it's in this direction we all have to go - we have to start to see the whole life cycle," concludes Chris Nuttall.



Mission: To win over Generation Z

NCAB Group is working actively to build strategies for the future. Our latest report focuses on the preferences and priorities of the next generation, Generation Z, which is about to enter the industry. Rikard Wallin, Managing Director of NCAB in Sweden and internationally certified future strategist, is in charge of the company's analysis work. Here, he throws light on a number of issues related to the subject.

Why are future strategies important?

"When talking about the future, most of the forces that influence a company are really beyond its control. Its operations are determined by major events in the world around it. Changing patterns of travel, for example, or events on the global political arena, or new scientific and technological breakthroughs. It is precisely for this reason, that it is vital that we continuously study developments in the world around us and gauge its possible effects on the company in the future. We can at the same time also study the resilience of our operations in the face of possible major disruptions and adopt strategies to cope with them."

NCAB's latest future strategy report looks at what you can do to position yourselves as the first choice for Generation Z in 2027.

Why the focus on this specific issue?

"All companies in it for the long haul should already now be asking themselves what they should do in order to maintain successful operations in the future, when today's ten-year-olds have started working in their industry. The rapid technological developments impact the new generation also indirectly, through influencing attitudes and ways of thinking. At the same time, children today are of course also exposed to many other influences in our changing society."

"We set up a project group consisting of younger employees as well as bringing in external members. With their help, we have tried to identify the forces that are making an impression on what is referred to as Generation Z, that is, those born around the millennium shift. What kind of rationale will steer them? What today's ten-year-olds feel is important when they start working in the electronics industry. And what measures do we need to take to build platforms for doing good business with them?"

What trends did you identify?

"The work is ongoing and there is room to further hone our conclu-



"All companies in it for the long haul should already be asking themselves what they should do in order to maintain successful operations in the future, when today's ten-year-olds have started working in their industry."

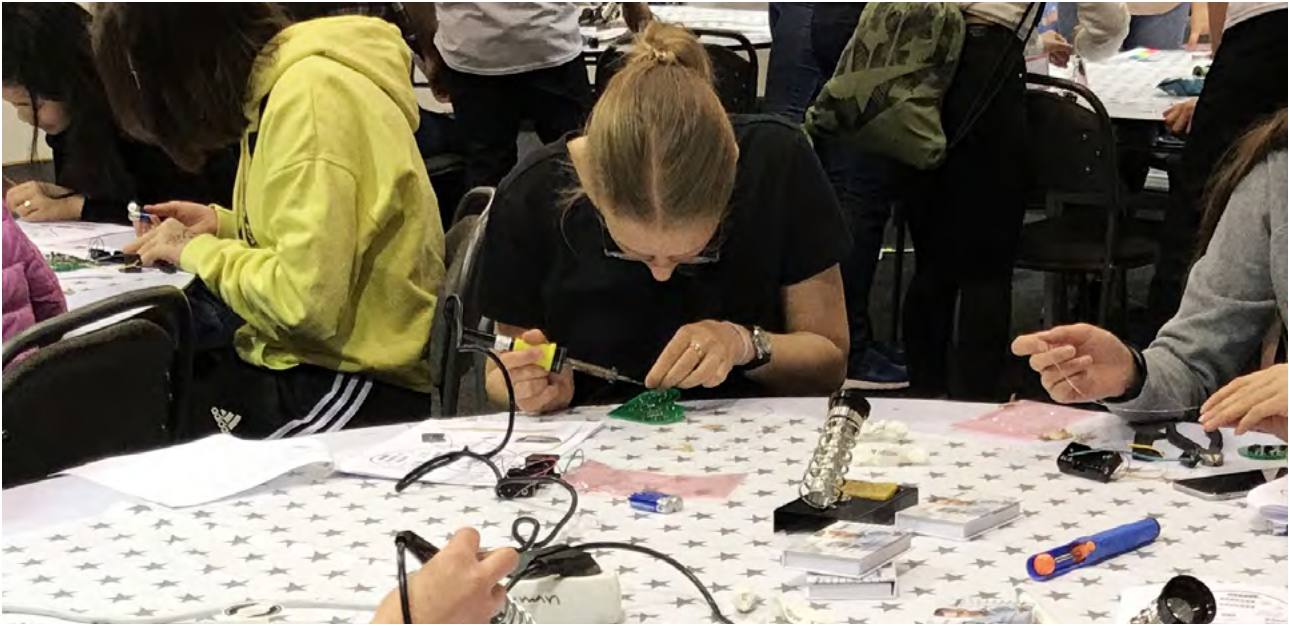
RIKARD WALLIN, MANAGING DIRECTOR, NCAB GROUP SWEDEN

sions, but we have identified four areas that we feel will be important. Firstly, we think that it will become increasingly common to **share technical skills** when creating and developing new products and services. With the end-products becoming more technically advanced, the entire production chain will need more technical competence. The new generation will expect that the industry is ready to share that knowledge

"Also, Generation Z won't have the patience to wait for information. They will want to be **continuously well-informed** and feel confident, to the point of taking it for granted that, for example, deliveries arrive as promised. They will want to be able to check at any time that things are going as planned. This will really test companies' ability to operate transparently and share information. Generation Z will also take quality for granted. Things will just have to work, period."



Chris Nuttall sees recycling as an area where there is great deal of room for improvement: "In Japan, manufacturers are responsible for recycling their used products, which influences the process all the way back to its initial stages. In this scenario, the owner of the design incorporates ease of recycling as a factor when shaping a product right from the start, on the drawing board. I think it's in this direction we all have to go - we have to start to see the whole life cycle."



At the SEE (Scandinavian Electronics Exhibition) exhibition in Kista, Sweden earlier this year, NCAB Group sponsored an initiative aimed at attracting more young people in general, and young women in particular to the electronics industry. During one day, it was time for "Girls In ICT" which is an international concept aimed directly at young women between the ages of 13-19. This included an activity that saw the young participants mounting a heart rate monitor on a heart-shaped PCB designed by NCAB Group.

"We also predict that it will become increasingly important to be able to **attract the right employees** in a global labor market. To do this, and retain those already working for the company, there will have to be clear career paths on offer, as well as opportunities for continuous individual development and clear and well-defined goals. It will also require a corporate culture that can handle the constantly changing conditions a modern business has to operate under.

"To remain relevant, we need to possess strong technical skills that we can share with customers."

RIKARD WALLIN, MANAGING DIRECTOR, NCAB GROUP SWEDEN

"Finally, **environmental awareness** will be an important aspect for the growing generation. A far greater focus will be put on environmental issues and they will continue growing in importance. There is an inherent paradox here, since the consumption pattern will at the same time lead to growing wants and needs among people, for both existing and new products. Nevertheless, we feel that being able to offer sustainable production and minimize the environmental impact of each part of the supply chain, will be a winning concept for the future."

What effect will this have on NCAB's strategy?

"In many ways, these trends are interlinked and we can stay abreast of them through being consistent. To remain relevant, we need to possess strong technical skills that we can share with customers. Having those skills is also crucial as a tool to help us identify factors that can have a bearing on our success in the future, such as the quality and environmental impact of our PCBs.

"In the future, we will also be looking to refine and streamline our customer communications. Moreover, we have to be even better at helping our employees grow their careers and offering them well-defined opportunities in that direction. Being a value-based company that puts sustainability high on its list of priorities will also bolster our ability to attract and retain the right people. We aim to continue growing and improving in this area.

"However, while it's all very well to say that you are guided by

values, it's vital to remember that what ultimately defines us is how we translate those values in practice. We must stand for our values, not only with regard to the environment but also by creating an excellent working environment and great relationships with our customers. To achieve that, we need a strong and stable base, where we are clear about what we stand for and do not take shortcuts. Being able to trust each other is also vital. Our customers should be aware of this and that they also benefit from it. We also need to ensure we always remain transparent in our dealings with customers."



Rikard Wallin, Managing Director, NCAB Group Sweden: "We set up a project group consisting of younger employees as well as bringing in external members. With their help, we have tried to identify the forces that are making an impression on what is referred to as Generation Z, that is, those born around the millennium shift.

Do you have any advice for NCAB's customers and partners?

"Admittedly the future generation's attitudes are laced with paradoxes. They want to prioritize sustainability, for example, while demanding fast deliveries, which is difficult to achieve in an environmentally friendly manner. But as I said, I still see environmental awareness as a trend that will only grow in the future.

Irrespective of what part of the production chain the company is operating in, there is still a need to review and build action plans based on the environmental impact of each specific operation. This applies all the way from design and development to final delivery. We at NCAB are keen to share our knowledge of sustainability with our clients.



Setting our sights on a 125 Year Jubilium

HANS STÄHL
CEO NCAB GROUP



According to former Cisco CEO John Chambers, 40 percent of the companies on Forbes Magazine's list of the world's 500 biggest companies will disappear from that list within ten years. This shows how important it is to gear up one's operations for long-term survival. NCAB is celebrating its 25th anniversary this year. We are proud of that, but have set our sights on a future scenario that will see us deliver PCBs for another 100 years. We are calling the concept that will take us there Sustainable Business.

This newsletter addresses two of the most important factors for long-term survival, our employees and the product. It is important for us to have a total grasp of future and current trends in PCB technology, but it is also vital to become more involved in the end products. Moreover, we need to gain insights into the way the next generation will approach the design side of PCBs, their purchasing behaviour and above all, their ways of communicating.

Looking at the future of the PCB, during the 30 years that I have worked in the electronics industry, there have been many discussions on the to-be's or not-to-be's of these components. So far, however, we have not seen anything resembling a new method that might replace PCBs. If and when

it happens, my guess is that it will be a long way into the future. In the fast-moving world we are working in, where new products and applications appear at lightning pace, shorter time to market is key, and today's PCBs are in this respect, extremely hard to beat as component bearers.

I am also convinced that the process of globalization is here to stay. NCAB is a company that was formed and continues to grow, as a result of this trend and we will see companies such as ours also appearing in other industries.

As more and more people interact across national borders, globalization is having an affect not only on companies, but human relations as well. From a personnel perspective, NCAB today is made up of at least 25 different nationalities, all of whom work smoothly and seamlessly together as if we were a single large family. Looking ahead, the coming "Generation Z" generation will feel even more at home in a globalized world and will find it even more natural to seamlessly interact across borders and cultures.

For long-term survival, it is crucial we adapt our technology and drive its development in the right direction. The same applies to employee development, where globalization is the keyword.



NCAB Group in Social Media

For a few months now, customers and other interested parties have been able to follow us on Twitter and

LinkedIn. We have also started a blog where we immerse ourselves in the versatile world of circuit boards! Follow us on:

» [Twitter](#) » [LinkedIn](#) » [Blog](#) » [YouTube](#)

Join us!

We're always looking for competent people. If you are a well skilled technician, customer service or

sales person, don't hesitate to contact us or send your resume to: recruitment@ncabgroup.com

Subjects we have covered earlier

Do read our earlier newsletters. You will find them all on our website, www.ncabgroup.com/newsroom/

» Factory management

2018 04 12 | NEWSLETTER 1 2018

» More electronics in smaller spaces

2017 12 15 | NEWSLETTER 4 2017

» Sustainable Business

2017 10 25 | NEWSLETTER 3 2017

» The PCB Industry in Asia

2017 06 29 | NEWSLETTER 2 2017

» Engagement and competence development in focus

2017 04 06 | NEWSLETTER 1 2017

» Future strategy

2016 12 14 | NEWSLETTER 4 2016

Are we taking up the wrong subjects?

We are always looking for interesting subjects that we could take a more in depth look at. If there is something you would like to learn more about, or perhaps you would like to comment on anything we have written, do get in touch with us and tell us more.

Mail: sanna.magnusson@ncabgroup.com