Can Bangladesh become a key player in the global **semiconductor industry?**

MD. ZAHIDUR RABBI

Semiconductors—small chips which can control the flow of electricity hide in plain sight inside our smartphones, computers, laptops, televisions, and air conditioners— are in almost any electronic device that one can think of. These tiny marvels form the foundation of virtually every modern innovation, which means that with the growing usage of electronic products, the semiconductor market - also called the 'chip market' - will scale up, offering tremendous potential for countries, businesses, engineers, and consumers alike.

According to a recent report by Fortune Business Insights, a global market research firm, the global semiconductor market size was valued at USD 611.35 billion in 2023 and is projected to grow from USD 681.05 billion in 2024 to USD 2062.59 billion by 2032, exhibiting a Compound Annual Growth Rate (CAGR) of 14.9% during the forecast period of 2024-2032.

However, the semiconductor manufacturing industry itself is a niche and well-guarded industry, one that requires highly trained personnel as well as costly equipment.

Building semiconductor fabrication plants - also known as fabs - is a capital-intensive endeavour, requiring billions of dollars in investment. These costly facilities manufacture integrated circuits (ICs) from raw silicon wafers, requiring advanced manufacturing tools, a clean environment with suits for workers, fan filter units, and a supply chain for raw materials.

While building these fab facilities and manufacturing chips may require a huge sum of investment and time, there is another field that launched Bangladesh into the stage of the semiconductor industry - the VLSI (Very Large-Scale Integration), a process for creating complex ICs by designing semiconductor chips.

Current industry status in Bangladesh

The domestic semiconductor industry is still in its infancy in this country. While large-scale chip fabrication or testing facilities are absent, the sector is dominated by a few startups focusing on design and simulation.

A paper published by the Metropolitan Chamber of Commerce and Industry (MCCI) in July 2024 titled 'Developing the Semiconductor Industry in Bangladesh', mentions two chip-designing firms, Ulkasemi and Prime Silicon, which were launched back in 2007. The paper also states that the industry of around 400 local chip designers now earns USD 6 million in export revenue.

Given Bangladesh's ongoing success in freelancing and IT outsourcing, the country is well-positioned to extend this model to semiconductor design services. With the right training and infrastructure, Bangladeshi engineers could contribute to global semiconductor projects, particularly in chip design and verification.

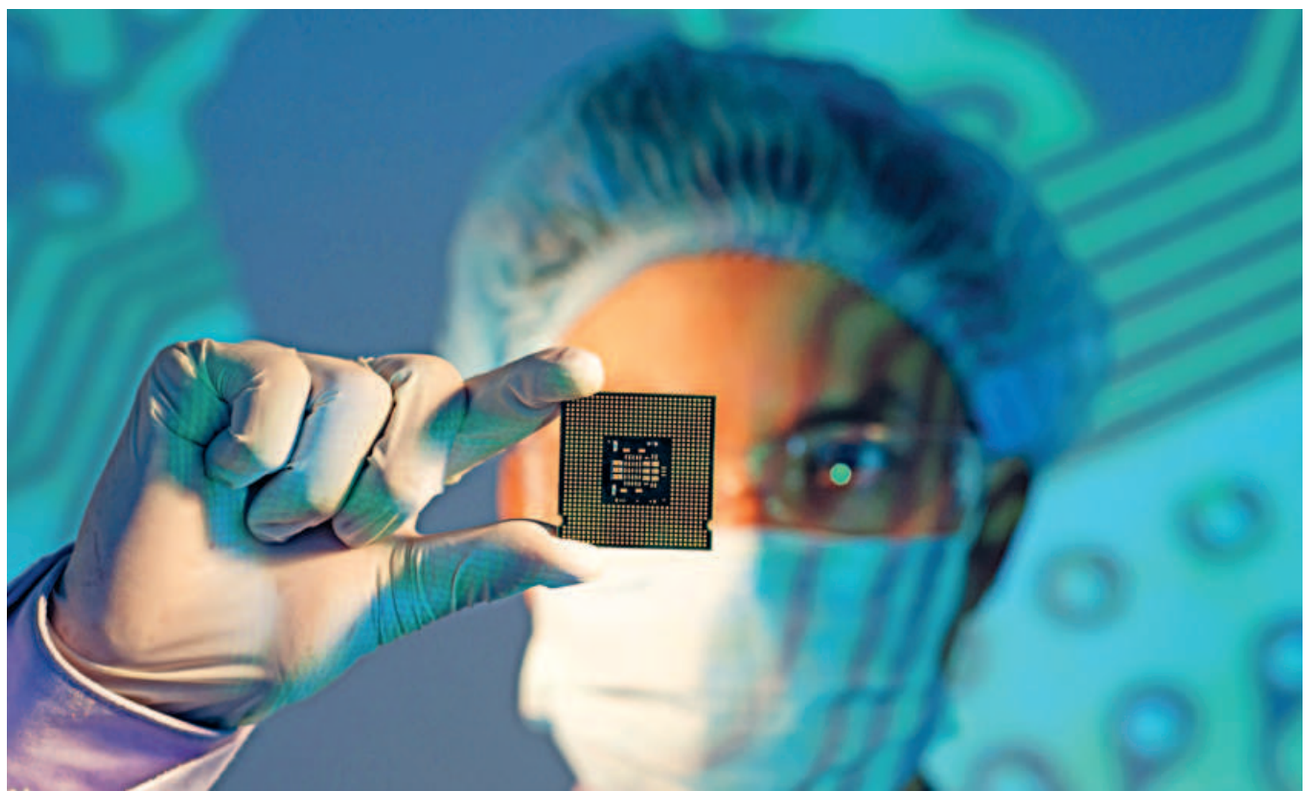
Educational foundations

As a niche sector, semiconductor manufacturing requires specialised knowledge and academia in Bangladesh, which has a growing interest in semiconductor engineering within its academic institutions.

Many universities have introduced courses on VLSI and microelectronics. These courses provide a theoretical grounding in semiconductor design, though practical exposure remains limited.

Dr Md Mostofa Akbar, Professor of the Department of Computer Science and Engineering (CSE) at BUET said, "I started teaching about VLSI at an undergraduate level from 1996. However, VLSI courses did not become popular as there was no related work in Bangladesh. But we are planning to buy equipment which will be helpful for the students."

Highlighting the importance of VLSI designing in regard to the semiconductor industry situation in Bangladesh, Professor Mostofa added, "There are four parts to semiconductor manufacturing - design, testing, structural verification, and fabrication. Most firms in Bangladesh focus on structural verification, but we need to give more attention to designing and testing if we want a sustainable ecosystem for this sector. The rise of AI and automation will soon shrink the opportunities for manual structural verification."



Representational image by DragonImages

"Design, testing, and structural verification mostly use software meanwhile, and in the case of chip fabrication, we need high-end facilities. Taiwan produces the best chips. However, it is unlikely for them to share their proprietary knowledge," shared Professor Mostofa. He added, "The government needs to coordinate with Bangladeshi expatriates so that Bangladesh can get more work and outsource in this sector. Proper investment and resource mobilisation is also crucial."

Competitions like VLSITHON, organised by Ulkasemi, a semiconductor design services company in Bangladesh, are stepping stones for young engineers to apply their knowledge. The 2nd edition of VLSITHON focused on RTL (Register Transfer Level) design and Analog design, and attracted 235 participants from 20 universities, highlighting the latent talent pool in Bangladesh.

Regarding the purpose behind the competition, Mohammad Enayetur Rahman, CEO and President of Ulkasemi, said, "Our main purpose is to create resources in this sector by making students aware. We understand that a lot of the universities in Bangladesh do not have any dedicated professors or courses for this sector. So, we are trying our best to make more people aware of the semiconductor industry in Bangladesh."

"We have been working in this sector for 17 years and we aspire to make Bangladesh stand out in the chip industry. Through competitions like these, we offer opportunities and jobs for students who want to pursue a career in this sector," said Enayetur.

About the industry practices, Dr Satyendra Nath Biswas, Professor of Electrical and Electronics Engineering (EEE) at Ahsanullah University of Science of Technology (AUST) said, "The main problem is keeping talents in Bangladesh. For example, an engineer with 3 to 4 years of experience in this sector gets 5 times more salary in the US compared to Bangladesh. India also pays 3 times more than Bangladeshi firms. Not just about industry-standard payments but the quality of life is also a big issue for some if we think about the existing problems like the security of life, traffic jams, and air pollution in Bangladesh."

"Bangladeshi students have the talent it takes to navigate in this field. They just do not get the proper recognition," shared Professor Satyendra, who also teaches at the Commonwealth University of Pennsylvania in the US. "I have taken advanced-level courses on VLSI at AUST. However, only 36 students got the opportunity to enrol in this course due to the shortage of facilities. In 2016, we bought Cadence Design Systems software at a 90% discount for BDT 30 lakh with 4 years licence. Around BDT 4 lakh was spent on buying server computers which are essential for running the software. The software needs to be renewed every 3 years and that costs about BDT 17 to 22 lakh, depending on research resources."

Regarding the sustainability of the chip industry in the country, Professor Satyendra said, "Bangladesh needs more contracts from abroad if the country wants to sustain itself in the semiconductor ecosystem. The government also needs to listen to experts if they want to avoid the failures of previous initiatives."

Government initiatives

The government also acknowledged the importance of this industry in Bangladesh and is working fast to implement an actionable roadmap and policy.

During a stakeholder meeting on December 18, 2024, titled 'Semiconductors - A new frontier for the Bangladesh economy and employment', it was announced that a high-level task force will be formed for the growth of the semiconductor sector in Bangladesh.

On January 1, 2025, Bangladesh Investment Development Authority (BIDA) announced a 13-member task force to address policy gaps, recommend incentives, and identify immediate opportunities in the semiconductor sector in Bangladesh. The task force comprises 3 members of academia, 3 industry experts, 3 non-resident Bangladeshi (NRB), and 4 members from the government. The task force will present actionable outcomes by the end of January, says BIDA.

The future of semiconductor engineering in Bangladesh is a story of potential waiting to be realised. Bangladesh might not become Taiwan overnight, which dominates the global semiconductor market, led by companies like TSMC, but while the challenges are considerable, the opportunities are too significant to ignore. Bangladesh could adopt an approach prioritising VLSI design and gradually moving towards manufacturing in the long term.

With strategic planning, foreign and domestic investment in education and infrastructure, research, talent development, and industry-academia collaboration, Bangladesh can carve out a place in the global semiconductor industry as it did previously with the freelancing and garment sector.

"However difficult life may seem, there is always something you can do and succeed at."

STEPHEN HAWKING

Apple to settle Siri lawsuit for $95 million

NEXT STEP DESK

Apple has agreed to a $95 million settlement to resolve claims that its Siri voice assistant unlawfully recorded private conversations and shared them with third parties. The settlement, submitted for approval in a California federal court last week, follows allegations that Siri frequently activated by mistake, capturing sensitive discussions without users' knowledge.

The lawsuit spans a class period from September 17, 2014, to December 31, 2024. Plaintiffs claimed that these accidental activations led to recordings being made and disclosed to advertisers.

HTML, CSS, and you

5 YouTube channels to learn hands-on web development

MARWAN KHADEM

Starting your journey in web development can feel like learning a new language—except, instead of having conversations, you are creating websites. If you've been thinking of building beautiful websites, all you need is a bit of HTML and CSS. And, of course, the right instructions to guide you along the way. Here are some YouTube channels with which you can learn hands-on web development, from the comfort of your own home.

Programming with Mosh

Whether you're just beginning or looking to level up your skills, Mosh's channel is the perfect place to kickstart your web development journey. His practical approach makes web development both easy and enjoyable. With Mosh Hamedani as your instructor, you'll gain the skills needed to create real-world applications confidently.

Must-watch video/playlist: HTML Tutorial for Beginners: HTML Crash Course

SuperSimpleDev

This channel's easy-to-follow tutorials will ensure that you gain practical skills to build websites. SuperSimpleDev provides a straightforward approach to mastering web development with clear explanations. By doing hands-on projects, you will become confident in coding and web development.

Must-watch video/playlist: HTML & CSS Full Course - Beginner to Pro

freeCodeCamp.org

If you are looking to gain HTML and CSS skills at your own pace, this channel's the right place to begin your journey. Their in-depth tutorials make even the complex topics very easy to understand. This platform is renowned as it offers high-quality coding tutorials and resources for both beginners and experienced developers.

Must-watch video/playlist: Learn HTML – Full Tutorial for Beginners

Envato Tuts+

The channel provides tutorials on a wide variety of topics, including web development. If you are looking to learn HTML and CSS from scratch, Envato Tuts+ has some high-quality content that provides clear, step-by-step instructions. It is an excellent resource for both beginners and experienced learners who want to improve their technical skills.

Must-watch video/playlist: HTML & CSS for Beginners | Free Mega Course

GreatStack

GreatStack offers practical tutorials for web developers to create stunning and robust websites. This channel can help you master HTML and CSS with its easy-to-follow lessons. Whether you are creating your first website or improving your existing skills, this channel will help you take on real-world challenges.

Must-watch video/playlist: HTML And CSS Projects for Beginners 2024 | HTML & CSS Tutorial With 5 Projects Source Code