



TECHIES

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Drone-based Gas Leak Detection: 'Sniffer' and Optical Gas Imaging - The Way Forward

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Gas leak detection is critical in an oil and gas plant because these facilities are known to handle hazardous and flammable gases on a daily basis. Accidental gas releases can result in fires, explosions, and toxic gas exposures, which can be catastrophic for personnel and the environment.

Some commonly encountered gases in oil and gas plants include methane, hydrogen sulphide, carbon monoxide, and volatile organic compounds. These gases can be colourless, odourless, and highly flammable, making them difficult to detect without specialised equipment.

Emerging technology: using drone for gas leak detection

The use of drones for gas leak detection is becoming increasingly popular as a way to monitor and detect hazardous gases in the environment. Here are some ways in which drones can be effective in gas leak detection:

Rapid inspection of large areas

Drones can cover large areas quickly and efficiently, providing a bird's-eye view of the facility. This can be especially useful for inspecting large oil and gas facilities, pipelines, and offshore rigs where manual

inspection would be time-consuming and expensive.

Increased safety

By using drones for gas leak detection, inspectors can avoid putting themselves in harm's way. This is particularly important in hazardous environments where there is a risk of explosion or other accidents.

Enhanced visual capabilities

Drones can carry specialised cameras - such as infrared or optical gas imaging cameras - that can detect gas leaks by identifying

changes in the infrared spectrum caused by the leaked gas. These cameras can detect leaks that may be difficult to identify by other means. Improved accuracy

Drones can provide high-resolution images and data that can be analysed in detail to identify and locate gas leaks with greater accuracy. This enables the identification of potential problems early, allowing for faster and more effective responses.

Cost-effective

The use of drones for gas leak detection is more cost-effective compared to traditional inspection methods such as manual inspections or the use of manned aircraft.

There are two main methods of gas leak detection that are used with drones: 'sniffer' and Optical Gas Imaging (OGI).

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"Sniffer" sensor mounted on a drone operating over an offshore platform.

'Sniffer' drone-based gas detection

A "sniffer" drone-based gas detection system refers to the use of unmanned aerial vehicles (UAVs) equipped with gas sensors to detect and locate gas leaks or other sources of hazardous gases in the atmosphere. These drones are often used in industrial settings, such as oil and gas facilities or chemical plants, where leaks can be dangerous and difficult to locate. The drones are able to fly over the area in question and use their sensors to detect the presence of various gases, providing valuable information to workers on the ground. The gas sensors can be of different types, including infrared, electrochemical, or photo-ionisation detectors, depending on the specific gas being targeted.

As the drone flies over the area, sensors sample the air and measure the concentration of target gases. Data is then transmitted to the operator, who can analyse it in real-time and identify any potential gas leaks or other hazards.

The main advantage of this method is that it is relatively inexpensive and easy to use. The sensors are small and lightweight, making them easy to mount on a drone. Additionally, the sensors are able to detect a wide range of gases, including methane, carbon monoxide, and sulphur dioxide. This makes 'sniffer' drone-based gas detection an effective way to monitor multiple

types of hazardous gases.

Another advantage of 'sniffer' drone-based gas detection is that it can be used in areas that are difficult to access. The drone can fly over difficult terrain or hazardous areas that would be too dangerous for humans to enter. This makes it an ideal method for monitoring hazardous gases in remote or dangerous locations.

Optical Gas Imaging (OGI) drone-based gas detection

An OGI drone is equipped with a camera that can detect and visualise gas leaks by detecting infrared radiation emitted by gases. It is an effective tool for inspecting and monitoring gas pipelines, industrial sites, and other areas where gas leaks are a concern. It offers a safe and efficient method of gas leak detection, reducing the need for manual inspections and minimising the risk of accidents.

OGI drones use specialised cameras that can detect infrared radiation emitted by gases. The camera is able to detect and visualise gases because different gases absorb infrared radiation at different wavelengths. The camera can also filter out other background radiation and shows only the gases being targeted for detection.

When an OGI drone flies over a gas pipeline or industrial site, the camera scans the area for any leaks. The camera can then produce a visual image of the gas plume in real-time,

allowing operators to identify and locate the source of the leak. This allows for rapid identification and mitigation of gas leaks, which can reduce the risk of explosions and other accidents. OGI drones can be operated remotely, allowing for safe inspections of hazardous or hard-to-reach areas.

The main advantage of this method is that it is more accurate than 'sniffer' drone-based gas detection. The infrared camera is able to detect even small amounts of hazardous gases, making it more reliable than 'sniffer' drone-based gas detection. Additionally, the camera can detect multiple types of gases, including methane, carbon monoxide, and sulphur dioxide.

Another advantage of OGI drone-based gas detection is that it can be used in areas with high levels of background radiation. The infrared camera is able to filter out background radiation, making it more reliable than 'sniffer' drone-based gas detection in these types of environments. Additionally, the camera can detect gases from a greater distance, making it more efficient and cost-effective.

In conclusion, both 'sniffer' and OGI drone-based gas leak detection have their advantages and disadvantages. However, OGI drone-based gas detection is more accurate and efficient. It is also more reliable in areas with high levels of background radiation and can detect gases from a greater distance. For these reasons, OGI drone-based gas detection is the way forward when it comes to monitoring hazardous gases in the environment.

Still, it is important to note that drones are not always the best solution for gas leak detection. Factors such as weather condition, visibility, and the need for detailed inspection in confined spaces can affect the effectiveness of drones used for this purpose. Additionally, drones are not a replacement for traditional gas detection equipment, which is necessary to detect gas leaks at ground level.

/chief editor's
note

Greetings in this festive month of Syawal!

TECHIES 17th edition and the next several editions will focus on the application of emerging technologies across businesses with the intent to keep MBOT members' awareness high on the latest technology applications taking place across a range of disciplines.

In our earlier TECHIES edition, the application of big data analytics, artificial intelligence, and internet of things have been discussed at length. The application of such technologies have led to issues like the formulation of solutioning packages that enable the application process to roll out effectively, as well as governance practices on data management that are required by the authorities.

We are pleased to dwell further upon the above two issues in this TECHIES edition, in the form of two separate articles – one on the formulation of solutioning, and the other on data governance.

On the formulation development required for solutioning, the growing complex needs of end customers have necessitated the convergence of technologies and infrastructure across disciplines. This has led to the need to develop innovative approaches and methodologies to ensure that successful integration of the technologies and infrastructures could be achieved. The speed upon which the solutions are to be rolled out is getting shorter due to commercial pressure. We present here an article that deliberates on pace methodology, which gives priority to progress rather than perfection.

For the data governance, the process of managing the availability, usability, integrity and security of data has become more complex and challenging in view of data size and security measures needed to safe guard it, hence requiring effective data governance practices. The challenges and opportunities are explored in the article.

To add, in this current edition, one more technology application is delved into, which is the application of drone technology equipped with sensor devices to detect gas leaks in high risk settings such as oil and gas processing plants.

Enjoy!

Datin Ts. Dr. Zuraidah Mohd. Zain

/mbot
insider

Sustainable technology is the answer

Malaysia continues to depend on food imports, which amounted to a RM55.5 billion outflow last year.

We import our food supplies from Australia, China and Europe.

Food is just one example. Almost everything that we consume comes from China, Taiwan, Korea, Bangladesh, Germany, and many more places. We are an import-dependent country.

However, technological progress must not contribute to any environmental issues. It must be sustainable, and importantly, it must address the rights and needs of the people.

This underpins all socio-economic aspects and the livelihood of the people.

Technology should help us leave our grandchildren a better world.

Any technology used to make a product must not have a negative effect on the environment or ecology.

Contamination of our air, water and environment must be moderated by sustainable technology. We have to find ways to use biodegradable materials, replace non-renewable resources with renewable ones, and use energy and resources efficiently.

It must be an innovative blend of technology aligned with sustainability goals.

In technology, solutions that we want to produce that are intended to solve

existing problems must not lead to other environmental or social consequences.

Lastly, proper testing before deploying technology is an integral part of the public rollout.

Companies must test new technologies in the early stages of development to mitigate any consequences that may arise.

This also helps to offset additional costs that may occur if the technology shows errors in later rollout stages.

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Registrar, Malaysia Board of Technologists

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Data Governance in the Age of AI, Blockchain, and Other Emerging Technologies

Emerging technologies such as Artificial Intelligence (AI), Blockchain, and The Internet of Things (IoT) continue to transform the way organisations compile, handle and apply data. This has led to the increasing need to develop effective data governance strategies.

Data governance is defined as the process of managing the availability, usability, integrity, and security of data. With the advent of numerous new technologies, it has become more complex and challenging to deal with data effectively. Hence, it is imperative for any organisation to continue implementing effective data governance practices.

In this article, the challenges and opportunities of data governance in the age of AI, Blockchain, and other emerging technologies are explored.

AI and Data Governance

AI has revolutionised the way data is processed and analysed. With AI-powered tools, it is now possible to analyse large volumes of data in a matter of minutes, which would have taken months or even years with traditional methods. However, this has presented a significant challenge for data governance. AI algorithms can quickly become biased or discriminatory, and hence it is crucial to ensure that the data used for training these algorithms is unbiased and free from any prejudices. This is where organisations will have to overcome the challenge by establishing ethical and transparent practices for AI-based data processing to ensure that it is used in a fair and responsible manner.

Blockchain and Data Governance

Blockchain technology is gaining increasing attention for its potential to revolutionise data management. Blockchain provides a secure and tamper-proof way to store and transfer data, and its decentralised nature eliminates the need for intermediaries. However, the technology presents a unique data governance challenge. Blockchain is built on the principle of immutability, which means that once data is recorded on the blockchain, it cannot be modified or deleted. This poses a significant challenge for organisations to comply with data privacy regulations such as the General Data Protection Regulation (GDPR). In addressing the challenge, organisations will be required to develop policies and procedures for managing data on the blockchain, including the procedure for data modification or deletion whenever required.



IoT and Data Governance

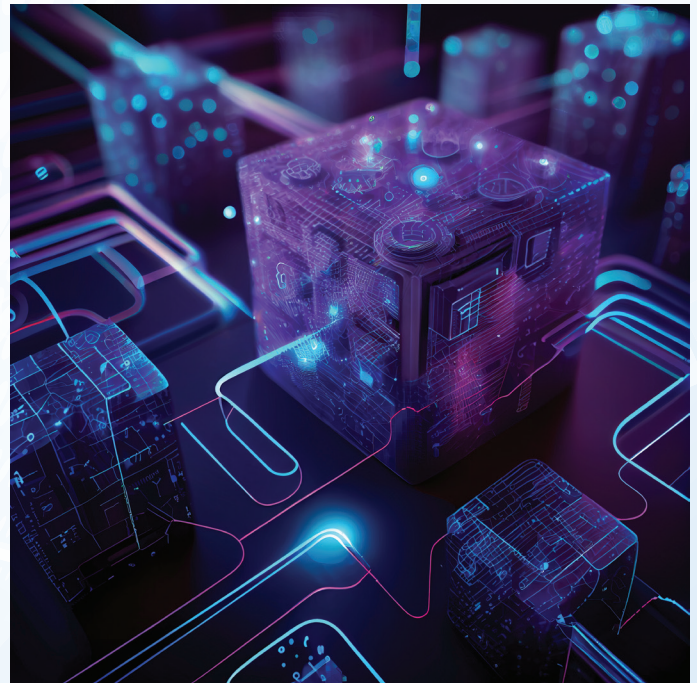
The Internet of Things (IoT) is another emerging technology that is transforming the way organisations collect and use data. With the proliferation of connected devices, vast amounts of data on customers - such as their behavior, product usage and other metrics - can be collected. This presents a significant challenge on data governance arising from the sheer volume of data generated, which can quickly overwhelm traditional data management processes. Therefore, it is vital to develop and establish more comprehensive and robust processes for acquiring, managing and securing IoT data, which will also provide a more secure platform to maintain data privacy and security.

Best Practices for Data Governance in the Age of Emerging Technologies

To effectively manage data in the age of emerging technologies, robust data governance practices must be established. Here are some best practices that organisations can consider to adopt:

1. Develop a comprehensive data governance framework that outlines policies, procedures, and roles and responsibilities for data management.
2. Ensure that data governance practices are aligned with the organisation's business goals and objectives.
3. Develop clear policies and procedures for collecting, storing, and using data, including procedures for handling sensitive data.
4. Implement data quality control measures to ensure data accuracy, completeness, and consistency.
5. Establish clear data ownership and accountability to ensure that it is managed effectively.
6. Develop clear policies for data privacy and security, including procedures for handling data breaches and ensuring compliance with data privacy regulations.
7. Establish regular data governance audits and reviews to ensure that policies and procedures are consistently followed.

A common yet challenging aspect that all organisations face when implementing data governance practices is overcoming the resistance to change. Data governance requires a significant cultural shift, and it can be difficult to get stakeholders to buy into new policies and procedures. Hence, organisations should develop a comprehensive change management plan that involves stakeholders at all levels. Involving stakeholders in the process can ensure that data governance practices are tailored to the organisation's unique needs and priorities.



Another critical aspect of data governance in the age of emerging technologies is the need for collaboration. Effective data governance requires collaboration between various departments and stakeholders within the organisation. This includes IT, data management, legal, compliance, and business stakeholders. Fostering collaboration and communication can ensure that data governance practices are aligned with the organisation's business goals and objectives.

As emerging technologies such as AI, Blockchain and IoT are adopted, data governance has become more critical than ever. Effective data governance practices are needed to ensure that data is used in a responsible and ethical manner. By applying the best practices for data governance, organisations can establish robust data management processes that enable them to make better decisions, improve customer experiences, and gain more competitive advantage. As emerging technologies continue to evolve, data governance practices have to also evolve to address new challenges and opportunities that come along.

Best practices for data governance - including developing comprehensive data governance framework, establishing clear policies and procedures for data collection and use, and fostering collaboration and communication across departments and stakeholders - can ensure that organisations are managing data effectively and responsibly in the age of emerging technologies.

Emerging Technology – Solutioning for the Future

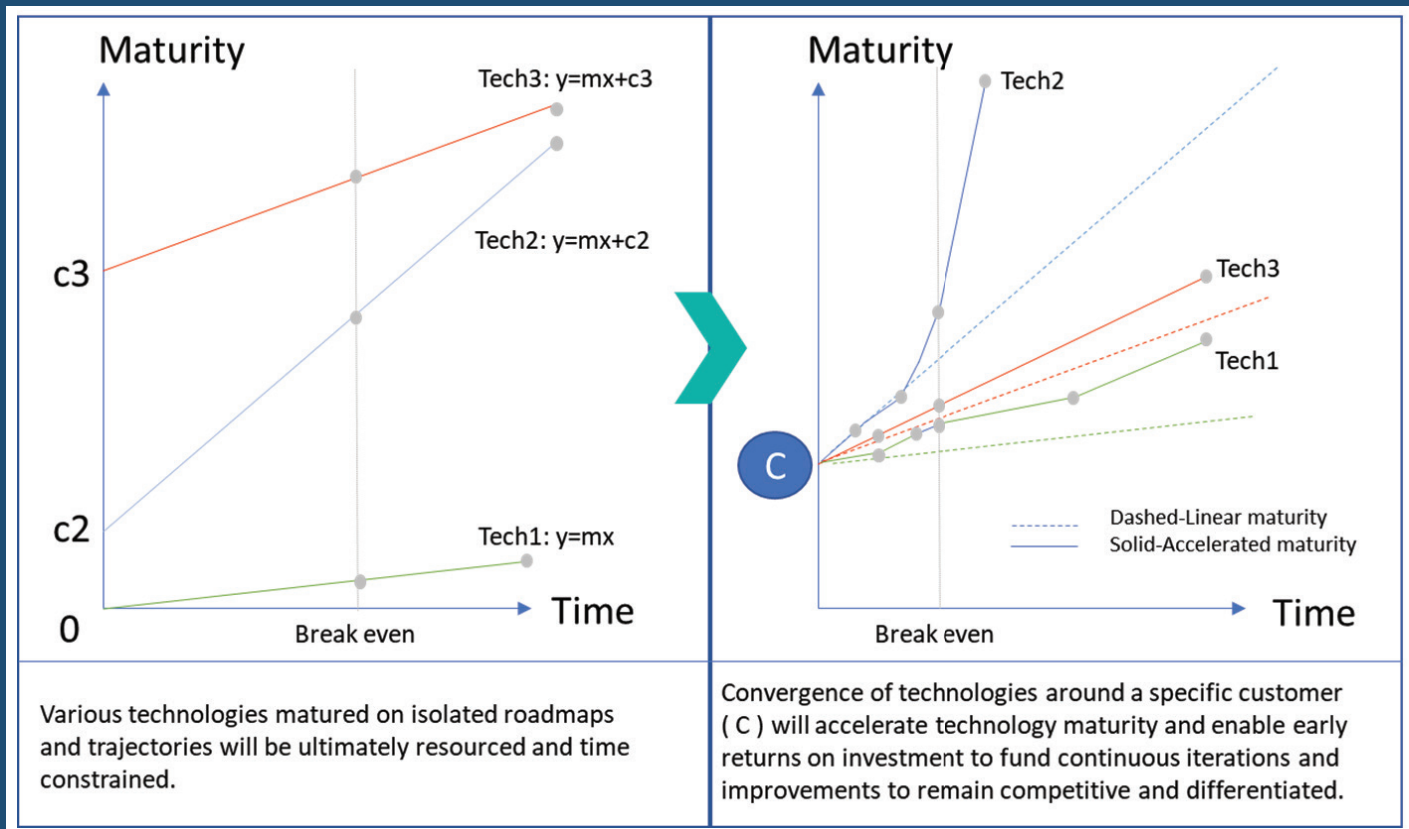
The last 5 years have seen tremendous growth of digital technology consumption driven by the pandemic as well as by numerous geopolitical and environmental disruptions. The drive for innovation is pushing the boundaries of possibilities for both humans and machines to meet the increasing demands of societal, economic, and environmental goals. Yet, the digital technology sector is downsizing while having to deliver more, faster, and cheaper. The question is, how do technologists and innovators respond to this paradox?

Converge: Bringing technologies together for the customer

Industrial Revolution 4.0 technologies such as Industrial Internet of Things (IIoT), Artificial Intelligence (AI), Cloud, Blockchain, and Digital Twin – to name a few - have made a big bang across all industries and sectors. While there has been an abundance of pilots and proofs-of-concept, these technologies are scarcely associated with significant success at scale, and are limited to specific use cases only.

When technology development is shifted to focus on the needs of the end customer, or a worldly cause, creative combinations of technologies and development methodologies appear, which in turn disrupt and create step changes with rapid adoption. Successful innovations of late converge existing technologies and infrastructure to accelerate the go-to-market lead times and return on investments.

One example is ChatGPT, which is an artificial intelligence chatbot developed by OpenAI launched in November 2022. It is a convergence of AI and Chatbot technologies, and is essentially a merger of search engine and digital assistant capabilities. The novelty of ChatGPT lies in algorithms that mimic human



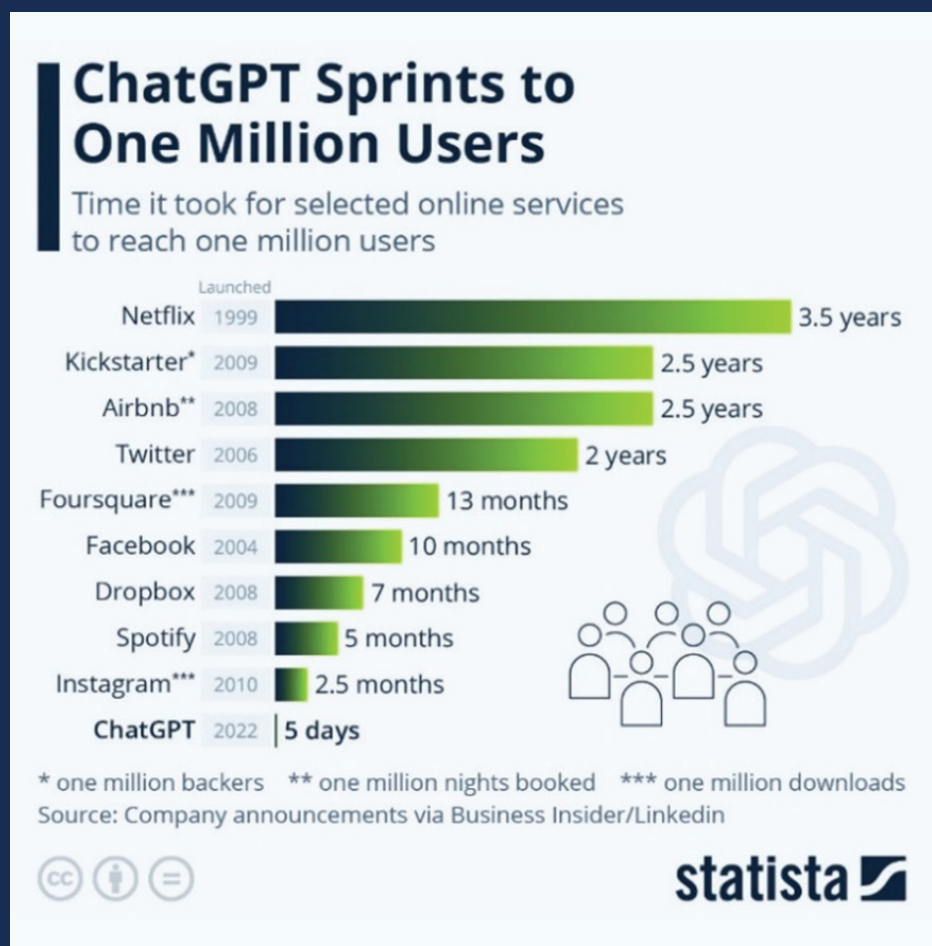
The hypothesis of converging technologies to the customer in driving pace of technology development and maturity.

like responses to (almost) any questions (to a certain degree of confidence). ChatGPT achieved a phenomenal adoption rate of 1 million users in just 5 days, beating Instagram by almost 15 times and Netflix by 30 times (see Figure 1).

ChatGPT technology is available to the masses, straight into the pockets of customers because it leverages existing digital infrastructure, services, and devices that users already have. Adoption and growth are driven by social engineering, which plays mainly on customer's instant gratification and fear of missing out (FOMO), such that it has now made its way into board rooms, legal proceedings and even school examinations. All of this is accessible to users for free or for a small subscription fee for ChatGPT Plus, which adds additional features and priority services.

Pace: Progress over perfection
In technology-based products and project management processes, various methods are practiced to balance quality, time, and cost. Proven mechanisms such as stage gates, risk management, backlogs, change management, etc., are used to assure value, de-risk decisions and sustain growth. As customer demands evolve faster, with greater emphasis on satisfaction and scrutiny on price, the pace and veracity of technology development requires rethinking to stay ahead of the curve.

With increasing adoption of Agile methodology developed in the software industry, adjacent sectors are now adopting this approach to accelerate development through rapid experimentation and iteration with customers, prioritising progress and customer acceptance over perfection. It is highly disciplined, resource constrained and time-boxed within a sprint. Each end of a sprint delivers a usable,



Adoption rate to 1 Million users. Source: Statista.

testable version of the product with the customers called Minimum Viable Products (MVP) or Minimum Lovable Products (MLP). These tests and constant improvements continue with the customers throughout the lifecycle of the product. One caution on Agile is that it must be implemented correctly and it must always stay true to delivering outcomes and not merely mark different phases of development. Agile is not a truncated Gantt Chart or a project that constantly gets re-baselined.

This is where technology start-ups are making an impact. With limited resources, innovations are developed fast, focusing on niches of technology applications that disrupt existing business models and provides customers with new and delightful experiences. There

are many examples that can be seen on the success of startups globally and the disruptive use of technology.

The winning formula for innovation and solutioning for the future is pace. Time to market of disruptors and game changing solutions are critical to ensure impactful delivery and early returns on investment that can fund further iterations and improvements needed to maintain competitive advantage in the market. Leveraging an existing ecosystem is also important to reduce barriers of entry so that resources and efforts are channeled to real innovation. A depiction of this hypothesis is shown in Figure 2.

And this article was not created by ChatGPT!

Technology & Technical Working Group (TTWG) Workshop

25 FEBRUARY 2023 | SUNWAY PUTRA HOTEL, KUALA LUMPUR

On 25th February, MBOT held a Technology & Technical Working Group (TTWG) Workshop at Sunway Putra Hotel Kuala Lumpur. The workshop was attended by 80 panelists comprises of government agencies, industry players and academia.

During the workshop, Prof. Ts. Dr. Mohamed Ibrahim bin Abdul Mutalib, Board Member of MBOT and Vice-Chancellor of Universiti Teknologi PETRONAS (UTP) had a special sharing session with the participants. Prof. Dato' Ts. Dr. Zaliman bin Sauli and Ts. Ir. Yam Teong Sian, Board Member of MBOT also attended the workshop and had a brief talk about technology practise and way forward of MBOT in general.



The main purpose of this workshop was to obtain input and views from TTWG members on professional technology practices in the areas of technology recognized by MBOT. In addition, this workshop will also discuss matters related to the need to improve the Technologists and Technicians Act 2015 (Act 768).

TTWG serves to advise, provide input and insights on the technology fields recognised by MBOT. This is to ensure that MBOT is always relevant and in line with the latest developments in carrying out its functions as a professional body.



/mbot registration

40,209

Graduate Technologists

8,177

Qualified Technicians

18,359

Professional Technologists

2,195

Certified Technicians

68,940
Total MBOT Registrants

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