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AI AUGMENTED DECISION INFRASTRUCTURES:

Enabling Malaysian Offshore Maritime Technopreneurship through Intelligent Dynamic Positioning Ecosystems

By Capt. Ts. Dr. Mohd Awiskarni bin Shamsudin, Dunster Business School Switzerland (DBSS)

Offshore activities along Malaysia's coasts and deep water routes are becoming more demanding as projects move into harsher environments and face stricter regulatory and commercial constraints. In this setting, artificial intelligence is shifting from a supporting analytical tool to a core decision layer influencing navigation, maintenance planning, and commercial choices. When integrated into Dynamic Positioning (DP) vessels, sensor rich platforms and digital twins, AI capabilities can deliver more consistent station keeping, improved fuel management, and better utilisation of high value offshore assets than conventional approaches. This article explores how AI augmented DP ecosystems can underpin new offshore technopreneurial ventures in Malaysia, focusing on DP capability, predictive operations, and data driven business models, while recognising associated risks and governance needs.

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/chief editor's note

Artificial Intelligence and Entrepreneurship

Artificial Intelligence has moved beyond being a conceptual frontier. Today, it is widely understood, increasingly accessible, and applied across sectors. The national discourse should no longer be centred on awareness and adoption, but on its tangible impact on the nation's development. We must now become creators of AI-based technologies.

The key question is: how do we generate wealth from our AI knowledge and innovations? The focus must shift towards translating locally developed AI-based technologies into sustainable economic drivers. This includes scaling AI solutions for both domestic progress and global competitiveness, ensuring that our innovations are not only relevant but also influential on the international stage.

Strong collaboration across academia, industry, and government is essential. Academia must translate research findings into practical solutions that meet industry needs, while industry investment is vital to support research and development activities in universities. These efforts must be supported by progressive and enabling government regulations.

Looking ahead, more AI-based technology entrepreneurs will be essential to advancing economic growth. It is hoped that TECHIES 33 will serve as a starting point towards this vision.

Assoc. Prof. Dr. Mohamad Asmidzam Ahamat

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Evolution of Offshore DP in Malaysia

Malaysia's offshore sector originally relied on crew-led navigation, manual station-keeping, and reactive maintenance to support oil and gas platforms. As operations extended into deeper waters and more complex subsea infrastructure, DP systems were introduced to maintain vessel position and heading where anchoring was not feasible, such as near drillships, construction support vessels, and ROV tasks.

Early DP solutions used deterministic control, limited sensor fusion, and conservative safety margins, which restricted operating envelopes and increased fuel consumption. Over the past decade, marine digital and remote services have expanded rapidly, influenced by national digital economy policies, smart port initiatives, and tighter environmental expectations. In this environment, AI-enhanced DP, voyage optimisation, and predictive maintenance add learning capabilities to traditional DP logic, allowing models to adapt to metocean conditions, vessel responses, and equipment health. This progression opens space for Malaysian technopreneurs to offer solutions that combine operational robustness with data-driven innovation.

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Prestige Technology Characteristics

Prestige maritime technologies are best defined as systems that set reference standards for safety, reliability, and lifecycle value under demanding offshore conditions, rather than simply expensive or novel equipment. Within AI enabled DP ecosystems, several characteristics collectively support this form of technological prestige:

- Cognitive situational awareness: AI models integrate thrust, motion, weather, and proximity data to infer risk states more consistently and quickly than manual watchkeeping alone.
- Self-optimising control loops: Machine learning layers adjust thrust allocation and heading in real time, reducing fuel use while maintaining strict clearance zones around offshore structures.
- Predictive asset intelligence: Detection of subtle vibration, temperature, or power quality anomalies enables maintenance to be scheduled before failures occur, extending asset life and limiting unplanned downtime.
- Data centric business models: Operational data can be anonymised and converted into benchmarking dashboards, risk indices and emissions analytics that generate recurring revenue.
- Assured compliance and transparency: Automated logging of positioning performance, emissions, and maintenance events simplifies demonstration of conformity with safety and environmental codes.

For Malaysian technopreneurs, embedding these attributes into offerings provides a way to differentiate local services and attract higher value regional and international partnerships.

Applications and Venture Pathways

AI capabilities relevant to Malaysian offshore technopreneurship span several DP-centric domains.
In offshore drilling and subsea construction, AI augmented DP supports precise station keeping around mobile units and subsea works under monsoon and swell conditions, while predictive analytics help reduce downtime during costly campaigns. Service providers can frame DP optimisation and health monitoring as performance-linked modules in support contracts.

In offshore supply and logistics, route optimisation tools can account for weather, currents, and port congestion to design fuel-efficient, just-in-time supply runs between shore bases such as Labuan and Kemaman and offshore installations, cutting emissions and turnaround times. Case studies of AI-supported routing in similar trades report fuel and emissions reductions of 5–10% on representative routes.

For ROV and subsea inspection, AI-driven DP sharpens micro positioning during launch, recovery, and close proximity tasks, especially when paired with sonar and visual analytics,

In offshore drilling and subsea construction, AI augmented DP supports precise station keeping around mobile units and subsea works under monsoon and swell conditions, while predictive analytics help reduce downtime during costly campaigns.

enabling niche services in high precision DP–ROV coordination.

In emerging offshore renewable energy, including wind and other marine resources, AI-enabled DP and digital twins can support cable laying, foundation installation, and maintenance in constrained corridors, creating prospects for ventures focused on low-carbon offshore construction support.

In remote condition monitoring, land-based centres can transform continuous fleet data into subscription insights on hull fouling, fuel performance, DP quality and compliance risks, enabling asset-light, data intensive business models.

Representative applications and value propositions can be summarised as:

AI Application Area	Operational Benefit	Technopreneur Proposition
AI optimised DP control	Tighter station keeping with lower fuel usage	DP optimisation services for high risk offshore projects
Predictive maintenance suite	Fewer failures; extended equipment lifetime	Multi vessel analytics for condition based maintenance
Voyage and route optimisation	Reduced fuel burn and emissions along supply routes	Carbon focused logistics planning tools
Remote operations centre	Centralised monitoring of DP and crew performance	Offshore control and monitoring hubs based in Malaysia

These archetypes can be combined into integrated platforms that coordinate optimisation, maintenance, and compliance across multiple vessels.

Impact, Governance, and Competencies

The spread of AI driven offshore capabilities has implications beyond individual ships. Intelligent marine services can reinforce Malaysia's ambition to be a regional hub for energy, logistics, and maritime innovation, supporting smart port and digital economy strategies while attracting investment and technology partnerships. Safety oriented AI functions can improve conditions for crews on long rotations, and more efficient routing and fuel management support national decarbonisation efforts. Growth in maritime technology ventures also contributes to high-skilled employment in areas such as data science, control engineering, and cybersecurity.

Substantial challenges accompany these opportunities. Offshore training data are fragmented among owners, charterers, equipment suppliers and regulators, complicating model development and raising questions about ownership, confidentiality, and consent. Addressing this requires collaborative data sharing frameworks, anonymisation techniques, and clear contractual arrangements. Integrating AI modules with legacy DP and sensor systems demands careful engineering and verification to avoid unintended control interactions, making hardware in the loop testing and recognised validation practises important. Concerns that extensive automation may erode crew competence point to competency-based training and "human on the loop" concepts that preserve professional judgement. Heightened connectivity increases exposure to cyber threats, requiring maritime cyber risk frameworks, segmented networks, and rehearsed incident response plans.

Capital intensive AI retrofits risk widening gaps between larger and smaller firms, underlining the need for inclusive capacity building, suitable financing, and supportive regulatory signals. MBOT aligned technologists have a central role in shaping governance, certification, and competency frameworks to ensure responsible deployment of AI enabled DP ecosystems.

Core competency clusters for MBOT professionals in this space include:

- DP systems integration and control engineering.
- Maritime data engineering and AI model validation.
- Cyber security for connected marine systems.
- Regulatory and standards literacy across maritime and digital domains.

Future Prospects and Conclusion

AI in Malaysian offshore operations is likely to progress from advisory applications towards more autonomous decision making in well defined scenarios, supported by fleet level learning. Data driven carbon accounting is expected to become common in charter negotiations, opening space for ventures that provide verifiable emissions intelligence and performance guarantees. Convergence with low Earth orbit connectivity, edge computing, distributed ledgers, and advanced robotics will further broaden the range of offshore services, while regulatory and professional frameworks will need to recognise AI and data governance as core elements of marine systems.

AI enabled offshore technologies are already reshaping maritime technopreneurship in Malaysia by reframing DP vessels as intelligent, data intensive platforms rather than purely operational assets. By combining advanced analytics, autonomous decision support, and predictive maintenance, technopreneurs can deliver improvements in safety, efficiency, and environmental performance while building ventures capable of scaling regionally. Realising this potential will depend on disciplined engineering, robust data and cyber governance, sustained skills development, and careful attention to ethical deployment so that benefits are broadly shared across the maritime ecosystem. With continued investment and active professional stewardship, Malaysia can strengthen its position as a regional reference point for AI driven offshore marine ventures and project a distinctive technological prestige into surrounding waters.

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The Ethical AI Strategist

an interview with

Ts. Syahrul Hafidz bin Suid

Chief Executive & Technology, MetrixOne Sdn Bhd

Ts. Syahrul Hafidz is a technology leader driving Malaysia's AI and digital transformation agenda. As Chief Executive & Technology at MetrixOne Sdn Bhd, he integrates governance, cloud architecture, and ethical AI into large-scale systems that serve both government and enterprise. A Professional Technologist (Ts.) and active contributor to national AI ethics initiatives, Ts. Syahrul is shaping responsible, state-scale AI systems designed to serve citizens while strengthening Malaysia's digital future.

Career and Experience

To begin, could you share some key experiences that shaped your journey toward your current leadership role?

My career spans three integrated domains. I developed expertise in compliance and governance at KPMG and CyberSecurity Malaysia, where I implemented ISO 27001 and data governance frameworks across the telecommunications and oil and gas sectors. This foundation shaped my conviction that governance and innovation must progress together.

At HPE, I architected Malaysia's sovereign private cloud platform for Government-Linked Companies (GLCs). This experience taught me how to design enterprise systems while simultaneously addressing data sovereignty, security, and scalability. Today, these capabilities are directly applicable to AI governance.

At Digi, Maxis, and Theta Technologies, I focused on aligning technology with business outcomes. As Director at Theta, I improved solution delivery win rates by 55% across more than 40 engagements. The key takeaway: technology succeeds based on organisational readiness, not technical sophistication alone.

At MetrixOne, I leverage all three dimensions, architecting AI transformation at the state scale, ensuring ethical governance, and building sustainable systems that responsibly serve citizens.

What initially inspired you to pursue a career in information technology and AI?

Early in my career, I witnessed how poor governance in an organisation can transform state-of-the-art technologies into liabilities. That experience drove me to understand how to architect systems that protect rather than expose.

Later, while building cloud infrastructure, I recognised the gap between data availability and the ability to leverage it safely for the public good. Government agencies possessed datasets capable of transforming healthcare, transportation, and education, but lacked the governance frameworks to do so ethically. This gap shaped my focus on AI, not as a technology problem, but as a governance and ethics challenge.

At MetrixOne, I operationalise this commitment directly by designing AI systems that serve government and enterprise clients while ensuring compliance with ethical governance standards and best practices. This ensures that the frameworks we develop are grounded in practical implementation experience, and that the systems we build are trusted by users and regulators alike.

As a Professional Technologist (Ts.), what does this title mean to you in practise and in your work?

The Ts. designation represents accountability at three levels: technical credibility, professional liability, and contribution to the profession.

Technically, it means staying grounded in implementation reality rather than abstraction. When I architect digital transformation masterplans at MetrixOne, I apply patterns validated in production systems serving millions of transactions, not consulting from theory.

Professionally, it means advising with fiduciary responsibility. My recommendations carry accountability beyond corporate interests.

As a member of TTWG-IT at MBOT, it means advancing professional standards across Malaysia's information technology ecosystem, ensuring technologists integrate technical depth with business and ethical judgment.

Leadership in AI and Information Technology

How do you see AI and data analytics shaping the future of Malaysian organisations?

AI will reshape organisations across three dimensions: operational efficiency (with 20–40% gains in mature implementations), predictive decision-making (shifting from reactive to anticipatory), and competitive positioning in the digital economy.

The real constraint isn't technology; cloud has largely democratised access, but organisational capability, the talent to customise and deploy solutions, governance structures to ensure compliance and ethics, and leadership that understands both opportunity and risk.

Many organisations in Malaysia are still in early adoption stages, limited by talent shortages and governance maturity. Success requires treating AI as a strategic capability, integrating investments in people, infrastructure, and ethical frameworks.

At MetrixOne, we address this through state level digital transformation masterplans that combine AI innovation with governance standards, creating a model for responsible AI adoption that other organisations can emulate.

How do you inspire your teams to innovate while ensuring a clear focus on tangible business outcomes?

Innovation requires discipline. I begin every initiative with a clear problem definition and measurable success criteria. Before building anything, we ask: What specific outcome matters? How will we measure it?

Second, we balance quick wins with strategic capability building, ensuring that short-term successes fund long-term investments.

Third, we learn continuously throughout implementation. Production systems reveal what works far better than planning alone. Properly documented lessons, including failures, are often more valuable than undocumented successes.

Finally, accountability matters. When teams understand that their work must deliver measurable value, innovation becomes focused rather than purely exploratory.

What are the most common mistakes companies make when adopting AI or advanced analytics, and how can they avoid them?

The seven critical mistakes organisations commonly make when adopting AI are as follows:

i. Unclear business problems. Organisations deploy AI before clarifying which outcomes truly matter. Solution: Define the specific problem and establish measurable success metrics as the first step.
ii. Tactical rather than strategic. Treating AI as an isolated project instead of an integrated enterprise capability. Solution: Embed AI into enterprise strategy and architecture from the outset.
iii. Poor data foundations. Even sophisticated algorithms fail when data quality is poor. Solution: Invest in robust data governance before building AI systems.
iv. Technical-only approach. Ignoring organisational readiness, training, and change management. Solution: Engage stakeholders early and address adoption challenges proactively.
v. Talent gaps. With Malaysia facing a 50% AI talent shortage, many organisations struggle to implement AI effectively. Solution: Systematic talent development through partnerships, training, and development programs.
vi. Ethical shortcuts. Rushing deployment without addressing bias, privacy, transparency, and accountability. Solution: Embed ethical governance at the architecture level, aligned with Malaysia's AIGE framework; it must not be an afterthought.
vii. Missing executive ownership. Delegating AI transformation to IT personnel alone limits impact. Solution: Require executive sponsorship and clear accountability for AI initiatives.

The common threat is treating AI as technology procurement rather than organisational transformation grounded in ethical principles.

Trends and Developing Future Technologists

Which skill do you believe is crucial yet often overlooked for the next generation of technologists?

Technical communication concerning the ability to translate between technical and business contexts is often overlooked. This includes clear documentation, systems thinking, and understanding socio-technical implications.

In my experience, career progression and impact depend more on communication effectiveness than coding ability. Technical brilliance alone, without the ability to explain it to decision makers, has limited value.

Technical communication encompasses three elements:

1. **Technical writing -** documentation, architecture narratives, and clear articulation of solutions.
2. **Systems thinking -** understanding how components interact across technical, organisational, and regulatory boundaries.
3. **Ethical reasoning -** comprehend the implications of technical choices on people, processes, and society.

These skills are often overlooked because they're harder to certify than coding ability. Yet they distinguish technologists who merely build demos from those who deliver sustainable, enterprise-level value.

How do you decide which new technologies are worth exploring and investing in?

I apply a systematic framework as follows:

i. Strategic alignment first. Does the technology address a specific, measurable business or strategic problem? Technologies seeking problems fail; problems seeking solutions succeed.
ii. Technical maturity assessment. Where is the technology on its maturity curve? Implementations in the government sector require proven reliability. Commercial opportunities sometimes justify earlier-stage technology for competitive advantage.
iii. Ecosystem and talent readiness. Can our partners or we

implement and operate this? Brilliant technology fails without people who understand it.

iv. Economic evaluation. Total cost of ownership vs. benefit realisation across realistic timeframes, using conservative assumptions.

v. Governance and compliance. What regulatory, privacy, bias, and ethical risks exist? My research as a PhD Candidate in AI Ethics and my role as Vice-Chair of the AI Ethics Sub-Working Group mean this lens is a standard practice at MetrixOne. We evaluate every technology against national ethical guidelines and operationalise findings from my research into practical governance frameworks.

vi. Strategic option value. Do platform capabilities enable broader applications? Point solutions have limited value compared to foundational infrastructure.

This framework prevents both reckless investment and conservative underperformance.

You have been actively involved in activities supporting students' development. What motivates you to engage with young people, and how have these interactions influenced you personally?

I serve as an External Industry Advisor at Multimedia University and Quest International University. Early in my career, I noticed the gap between theoretical knowledge and industry practice. While I graduated with a good grasp of concepts, it took years to understand how enterprise systems operate in real-world environments.

What I offer is a practitioner-educator perspective: I teach while actively designing AI systems at MetrixOne, leading government transformation, and co-authoring national standards. Students learn from current, real-world experience rather than case studies. The interaction is reciprocal. The questions asked by students challenge the assumptions I make, and explaining complex implementations often reveals opportunities for improvement. Their idealism about technology's societal impact reminds me why ethical deployment matters beyond mere compliance.

More fundamentally, developing the next generation of technologists is how I contribute to Malaysia's long-term competitive advantage. The systems I build will be replaced, but the professionals I help develop will shape Malaysia's digital future for decades.

Future of AI

How can the government, industry, and academia collaborate more effectively to strengthen the technology ecosystem?

The government should create enabling policies and convening platforms. Malaysia has made progress with Budget 2026, the Sovereign AI Cloud, and MADANI infrastructure. However, policies must also address structural barriers, such as tax incentives for industry–university research, streamlined approvals for collaboration, and intellectual property protection in joint ventures.

Crucially, the government should leverage its convening power by coordinating fragmented initiatives across ministries and systematically connecting universities with industry.

Industries must engage with universities beyond recruitment. For example, they can co-develop curriculum, offer real-world projects, and deploy practitioners as part-time educators. Invest in talent development systematically; the 50% AI talent gap reflects unrealistic expectations about market-ready specialists.

Academic institutions must align learning outcomes with industry needs while maintaining research rigor. The establishment of industry advisory boards is instrumental in curriculum development, helping incorporate real-world projects and measure success through graduate impact.

The summary of the foundation for AI Ethics Standards is as follows:

i. Fairness and Non-Discrimination - Equal treatment, diverse training data, and bias mitigation.

ii. Reliability, Safety, and Control - Secure function, robust safeguards, and risk management.

iii. Privacy and Data Security - PDPA compliance, rigorous testing, data protection.

iv. Inclusivity - Equal access, non-disadvantaging design, and participatory development.

v. Transparency and Explainability – Understandable processes, disclosed usage, and limitations in acknowledgement.

vi. Accountability - Clear responsibility, documented decision trails, and audit readiness,

vii. Human Benefit - Demonstrable social value, human capability enhancement, and harm prevention.

At MetrixOne, we operationalise these principles in every system we deploy, treating ethical governance not merely as a compliance obligation, but as a competitive advantage and the foundation for sustainable client relationships.

To accelerate collaboration, it is essential to establish:

- Co-located innovation spaces - such as technology parks and incubators - that enable spontaneous interaction across sectors.
- Support cross-appointment systems that allow researchers to operate across academia, government, and industry.
- Create collaborative funding mechanisms with shared investment structures that align incentives.
- Focus on national priorities, including RMK-13 and the AI Technology Action Plan 2026 - 2030. When the government articulates strategic priorities clearly, industry and academia align naturally.
- Measure ecosystem health by tangible outcomes: technologies commercialised, ventures created, problems solved, and jobs generated, not publications alone.

Collaboration should be viewed as a strategic necessity, not an optional activity. The success in digital economies through the strength of their ecosystems, the quality of interaction among government, industry, and academia, is more than through the excellence of any individual institution. Malaysia has strong components; the challenge is to integrate them into a high-performing system that drives innovation, talent development, and inclusive growth, all grounded in ethical AI principles that protect citizens while enabling responsible innovation.

By Assoc. Prof. Ts. Robert Abraham Mojolou, North Borneo University College

ECHOES OF THE PAST, TOOLS OF THE FUTURE:

How Technopreneurs are Reimagining Sabah's Dark Tourism through AI and Immersive Technologies

When History Speaks Softly, Technology Listens Carefully

Across Sabah, traces of the past remain quietly embedded in its landscape. War memorials, historical sites, and heritage locations linked to conflict and sacrifice stand as reminders of experiences that shaped communities across generations. These places do not tell stories of triumph, but of endurance, loss, and shared humanity.

Dark tourism refers to travel to such sites of historical tragedy or collective suffering. In Sabah, dark tourism is inseparable from the state's multicultural identity, shaped by more than 30 ethnic groups, including the Kadazan-Dusun, Bajau, Murut, Rungus, and others. The memories preserved at sites such as the Sandakan Death March Memorial Park, Kundasang War Memorial, and Petagas War Memorial reflect not only historical events but also the lived experiences of Sabah's diverse communities.

As tourism evolves in the digital age, a new question emerges: how can these stories be preserved, communicated, and experienced meaningfully by modern audiences? Increasingly, the answer lies in the hands of technopreneurs applying Artificial Intelligence (AI) and immersive technologies with care, creativity, and responsibility.

The Limits of Traditional Interpretation in a Digital Era

Many dark tourism sites in Sabah still rely on conventional interpretive methods such as static signboards, short descriptions, or limited guided tours. While these approaches provide factual information, they often struggle to convey the emotional depth and cultural complexity of historical events.

For younger visitors accustomed to interactive digital environments, or international tourists unfamiliar with Sabah's historical context, these methods may feel distant or insufficient. Language barriers further limit accessibility, and site operators often lack data on how visitors engage with content or what resonates most strongly.

These challenges are not signs of failure, but indicators of opportunity, particularly for technopreneurs seeking to apply technology in ways that enhance understanding rather than distract from it.

Artificial Intelligence as a Tool for Thoughtful Storytelling

Artificial Intelligence, when used responsibly, offers powerful capabilities for adaptive storytelling, intelligent content delivery, and personalised learning. In dark tourism, AI is not about automation for efficiency's sake, but about enabling deeper engagement with historical narratives.

When combined with immersive technologies such as Virtual Reality (VR) and Augmented Reality (AR), AI allows visitors to move beyond passive observation. Instead, they are invited into guided, reflective experiences that respect historical sensitivity while enhancing comprehension.

For technopreneurs in Sabah, this intersection of AI, immersion, and heritage presents a meaningful space for innovation.

AI-Powered Virtual Guides: Making History Accessible Across Cultures

One of the most practical applications of AI in Sabah's

dark tourism context is the development of AI-powered virtual guides and conversational chatbots. Delivered through smartphones or onsite kiosks, these systems can provide multilingual, on-demand interpretation tailored to different visitor needs.

At the Sandakan Death March Memorial, for example, an AI virtual guide could explain the sequence of events while highlighting how local communities were affected during and after the war. Visitors might explore survivor accounts, historical timelines, or educational modules depending on their interests and background.

Such solutions improve accessibility, reduce reliance on constant human staffing, and create scalable service models, opening clear technopreneurial pathways for local developers and startups.

Immersive Experiences that Reconstruct Context, Not Trauma

Immersive technologies supported by AI offer exceptional educational potential when applied with restraint and respect. In Sabah's dark tourism landscape, immersive experiences should focus on environmental reconstruction, contextual explanation, and emotional understanding rather than graphic reenactment.

For instance, AI-assisted VR experiences at the Kundasang War Memorial could allow visitors to visualise historical surroundings as they once were, accompanied by guided narration explaining wartime conditions, community resilience, and post-war recovery. Integrating perspectives from different ethnic groups reinforces the idea that history is collective rather than fragmented.

Local technopreneurs, with their cultural awareness and community connections, are uniquely positioned to design such experiences ethically and authentically.

Using AI Insights to Support Sustainable Heritage Management

AI's role extends beyond visitor-facing experiences. AI-powered analytics can help site operators better understand visitor flow, engagement duration, and feedback trends while respecting privacy.

These insights enable evidence-based improvements to site layout, content sequencing, and educational programming. For example, data may reveal which immersive elements resonate most strongly with visitors or where additional explanation is needed.

Technopreneurs can offer customised analytics solutions specifically designed for memorial and heritage sites, supporting sustainability while maintaining the solemn character of dark tourism.

Personalised Learning Journeys for Diverse Audiences

AI enables personalised educational experiences without compromising historical accuracy. School groups may receive structured narratives aligned with curriculum objectives, while general tourists access concise explanations highlighting key historical moments.

Researchers and heritage professionals, meanwhile, can explore deeper archival materials through AI-supported platforms. This layered approach enhances inclusivity and learning effectiveness, while opening opportunities for educational partnerships and digital content services.

Preserving Ethnic Memory through AI-Driven Digital Archiving

Many historical materials linked to Sabah's dark tourism sites, such as oral histories, photographs, and documents, remain fragile or under-documented. AI tools can assist in digitising, restoring, and organising these resources.

For example, AI-based transcription can preserve interviews with elders from different ethnic communities, safeguarding personal narratives that might otherwise be lost. These digital archives can then be integrated into immersive tourism experiences and educational platforms.

This approach allows technopreneurs to contribute directly to cultural preservation while developing socially responsible innovations.

Aligning Innovation with Sabah's Tourism Vision

The Sabah Tourism Board plays a central role in guiding tourism development across the state. While Sabah is internationally known for its natural attractions and heritage, dark tourism represents an important complementary segment.

AI-enabled immersive dark tourism initiatives align with the Board's emphasis on sustainable tourism, cultural preservation, and quality visitor experiences. Collaboration between technopreneurs, tourism operators, educational institutions, and the Sabah Tourism Board ensures that innovation remains aligned with broader state priorities.

Ethics as the Anchor of Future-Facing Innovation

Ethical responsibility must underpin all AI and immersive applications in dark tourism. Accuracy, cultural sensitivity, respect for communities, and data privacy are essential principles. Technology should deepen reflection and understanding, not sensationalise suffering.

Where Memory Meets Meaningful Innovation

Sabah's dark tourism sites carry echoes of the past that deserve to be heard with care and respect. Through Artificial Intelligence and immersive technologies, technopreneurs are discovering new ways to honour these histories while engaging modern audiences.

By blending technological innovation with cultural awareness and ethical responsibility, Sabah has the opportunity to lead the development of immersive, AI-enabled dark tourism experiences. In doing so, technopreneurs are not only building businesses, they are helping ensure that memory, meaning, and humanity remain at the heart of progress.

By Ts. Ir. Rafiuddin bin Abdubrani, Petra Energy and Ts. Dr. Zarith Liyana binti Zahari, Universiti Kuala Lumpur British Malaysian Institute

Hybrid AI Models and Technopreneurship: Turning Complex Research into Scalable Products

Artificial Intelligence (AI) has become one of the most powerful drivers of innovation in digital economy. From smart manufacturing to healthcare and intelligent transportation, AI-based solutions are increasingly shaping how industries operate. However, behind every successful AI product lies a challenging journey from research laboratories to real-world deployment. This is where technopreneurship plays a critical role, particularly when dealing with hybrid AI models that are often complex but highly impactful.

Understanding Hybrid AI Models in Simple Terms

Hybrid AI models refer to systems that combine two or more artificial intelligence techniques to solve complex problems. Instead of relying on a single algorithm, hybrid models integrate the strengths of different approaches. For example, deep learning can be used to extract meaningful features from complex data, while reinforcement learning can optimise decision-making based on changing environments.

In my own research experience involving electroencephalogram (EEG) signals collected in real driving environments, hybrid AI models were developed to address the challenges of noisy, non-linear, and highly variable human data. Real-time EEG signals recorded inside an actual vehicle are strongly influenced by motion, surrounding traffic conditions, driver behaviour, and environmental disturbances. Such conditions make EEG analysis far more complex compared to controlled laboratory settings, and conventional signal processing or single-model AI approaches often struggle to maintain consistent performance.

To overcome these challenges, hybrid AI models were employed by combining deep learning techniques for intelligent feature extraction with optimisation and decision-based learning mechanisms. Deep learning components enabled the system to automatically learn meaningful patterns from complex EEG signals, while decision-based learning enhanced adaptability by continuously optimising system responses based on real-time feedback. This integrated approach resulted in improved robustness and reliability, particularly when dealing with unpredictable real-world conditions.

However, achieving strong performance in research experiments was only the first step. Translating these hybrid AI models into usable and scalable products required a completely different mindset. Beyond accuracy, practical considerations such as real-time processing capability, system stability, ease of integration, and user acceptance became critical factors. This transition highlighted the importance of technopreneurial thinking, where advanced AI research must be simplified, engineered, and validated to deliver real value in operational environments.

Real-time EEG signal data acquisition using Emotiv EPOC.

The Gap Between Research and Real-World Application

One of the biggest challenges in AI technopreneurship is bridging the gap between research outcomes and industry needs. In academic research, success is often measured using performance indicators such as accuracy, precision, or area under the curve. In contrast, industry stakeholders are more concerned about system reliability, ease of use, cost, and long-term sustainability.

A highly accurate AI model may still fail in real-world environments if it is too complex, slow, or difficult to maintain. Through hands-on research and engineering experience, it

becomes clear that AI solutions must be designed not only to perform well on paper but also to function reliably in practical settings. This realisation marks the transition from being a researcher to becoming a technopreneur.

Simplifying Complexity Without Losing Intelligence

For hybrid AI models to become commercially viable, simplification is essential. This does not mean reducing intelligence, but rather optimising the system for real-world use.
Technopreneurs must carefully balance performance and practicality by reducing unnecessary computational complexity, selecting the most relevant features, and ensuring that models can operate efficiently on available hardware.

In research, models are often developed using powerful computing resources. However, in actual deployment, especially in industrial or mobile environments, resources may be limited. Successful technopreneurship involves re-engineering AI models to make them lightweight, efficient, and scalable without significantly compromising performance.

Designing AI Systems for Scalability

Scalability is another important consideration in technopreneurship. Hybrid AI models should be designed as modular systems, where different components such as data acquisition, signal processing, decision-making, and user interfaces can function independently. This modular approach enables systems to be upgraded, maintained, or expanded without requiring a redesign of the entire solution.

For example, an AI system developed for monitoring human fatigue can later be adapted for other safety or performance applications with minimal changes. Such flexibility increases the commercial value of AI innovations and opens opportunities for broader market adoption.

In applications related to safety and human well-being, AI systems should support better decision-making rather than replace human judgement. For instance, AI-driven fatigue detection systems can serve as early warning tools, helping organisations prevent accidents and improve operational efficiency.

Shifting Focus from Accuracy to Impact

A key mindset shift in technopreneurship is moving away from purely technical performance metrics toward impact-driven outcomes. While accuracy remains important, the real value of AI lies in its ability to solve problems, mitigate risks, and enhance the quality of life.

In applications related to safety and human well-being, AI systems should support better decision-making rather than replace human judgement. For instance, AI-driven fatigue detection systems can serve as early warning tools, helping organisations prevent accidents and improve operational efficiency. When AI solutions are positioned as decision-support systems, they are more likely to gain user trust and acceptance.

Ethical and Responsible AI Deployment

As AI technologies become more embedded in daily operations, ethical considerations cannot be ignored. This is especially true for systems that involve human data. Responsible technopreneurship requires careful attention to data privacy, transparency, and fairness.

Hybrid AI systems must be designed with clear boundaries on how data is collected, processed, and used. Users should understand the system's purpose and the process by which decisions are made. By adopting a human-centric approach, technopreneurs can ensure that AI solutions align with ethical standards and societal expectations.

Lessons for Aspiring Technopreneurs

Several important lessons can be drawn from developing hybrid AI models and translating them into practical solutions. First, deep technical knowledge is a strong advantage in technopreneurship, as it enables innovators to solve complex problems effectively. Second, successful AI products require system-level thinking that integrates technology, business, and user needs.
Ultimately, technopreneurship is not about abandoning research, but about expanding its impact beyond academic publications. When AI research is guided by real-world challenges and implemented responsibly, it can create meaningful value for industries and society.

Conclusion

Hybrid AI models offer tremendous potential for technopreneurship, but their true value emerges only when complex research is transformed into scalable, reliable, and ethical solutions. By combining strong technical foundations with entrepreneurial thinking, technopreneurs can bridge the gap between innovation and impact. As AI continues to evolve, those who can translate intelligence into real-world value will play a vital role in shaping a smarter and more sustainable future.

/mbot news

MBOT Officially Opens New Office at Menara Ochre @ Alamanda, Putrajaya

The Malaysia Board of Technologists (MBOT) marked an important milestone with the official opening of its new office at Menara Ochre @ Alamanda. The ceremony was officiated by YB Chang Lih Kang, Minister of Science, Technology and Innovation. Following the launch gimmick and ribbon-cutting ceremony, the minister toured the premises to view the facilities and engage with MBOT officers.

The ceremony was attended by YBhg. Datuk Seri Hj. Hasnol Zam Zam bin Hj. Ahmad (Secretary-General of MOSTI), YBhg. Dato' Ruziah binti Shafei (Deputy Secretary-General (Planning and Science Enculturation) MOSTI), YBhg. Professor Emeritus Datuk Ts. Ir. Dr. Siti Hamisah binti Tapsir (President of MBOT), YBrs. Dr. Md Fauzi Md Ismail (Registrar of MBOT), members of MBOT's senior management team, senior officers from MOSTI, and industry representatives.

Since its establishment, MBOT has operated at Ayer@8 Putrajaya, Universiti Malaysia Pahang Al-Sultan Abdullah, and a satellite office at Futurise Cyberjaya. In 2021, MBOT began operating solely at Ayer@8 Putrajaya before relocating to Menara Ochre @ Alamanda in February 2026. The opening of its new office will further strengthen MBOT's role as a key driver of the nation's technology and technical talent ecosystem.

Photo Credit: Ministry of Science, Technology and Innovation (MOSTI)

/mbot registration

65,225	14,990	27,354	3,935
Graduate Technologists	Qualified Technicians	Professional Technologists	Certified Technicians

111,504 Total MBOT Registrants (As of January 2026)

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