




CamEd
Business School

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CamEd Business Review

Is AI bubble real or false?

.....
..... AI is both a real shift
and a speculative bubble waiting
to correct. 
Here is a breakdown of the arguments:
.....
.....

July - December 2025

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Welcome Message from Chairman

Welcome to Vol.2 No.2 of CamEd Business Review!

In this issue, we gladly welcome a short research by our students on whether the AI bubble is perceived to be real. As is the case, publications touch upon areas immediately relevant to business, corporate strategy and financial tools. But we also continue to provide the platform for thinkers in social fields to bring to life their insights because it is crucially important to realize that the economy is much bigger than any specific specialization. Hence, our broad coverage calls for papers and ideas from notable contributors either as academics or practitioners.

I take the view that learning is a non-stop endeavor. As such, I invite readers to adopt an open-minded attitude as we strive to bring benefits to your continuous learning. Have a good read!

All the best,

Dr. Virak Prum

Chairman of the Board of Governors
CamEd Business School





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Professor, CamEd Business School*

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The Evolution of Strategy: An Opportunity for Cambodian Business Models

*By Kenneth Paul Charman, PhD
Professor, CamEd Business School*

1) Strategy, Evolution, and New Business Models

The Case for Cambodian Business Models

Understanding the strategy process, from an idea or a concept to a business model that provides value for customers, to a genuinely profitable business, is core skill. Knowledge of the strategy process provides both a rationale and usable frameworks to measure and assess ourselves, the world around us and the decision-making environment in which we operate. Studying strategy is not a guarantee for an idea, let alone a successful business, but using the strategy process can help us stay on track and avoid mistakes. Strategy also provides a platform to showcase business successes and failures, an important component of what is a core discipline in business education.

Like any science or discipline, strategy evolves as knowledge evolves. New regions emerge, new areas of competitiveness emerge and business models emerge. For strategy, one of the most important changes to the external environment in recent years has been the growing interest in the role of firms vis-à-vis society. These are represented by the incorporation of Corporate Social Responsibility (CSR), Responsible Business Conduct (RBC), and Environmental, Social and Governance reporting (ESG), into the competitiveness framework, and the emergence of Creating Shared Value (CSV) as a new basis for business models.

New kinds of business models have always shaken the world into thinking of the real core elements that add value and how value is perceived by customers. For example, low-cost airlines, streaming of music and entertainment, delivery to your home instead of going to a shop. All of these have changed perceptions of

how customers see value in a world that is changing fast and where these new business models and disruptive technologies appear and become mainstream so quickly. In this new environment for strategy, Cambodia has new business models to offer and to consider as models which can contribute to the evolution of strategy worldwide.

The Strategy Process and the Strategy Frameworks: The Focus on Competitiveness

Since the mid-20th Century, when the subject of strategy became mainstream in business education, it has remained focused on concepts of adding customer value, establishing priorities, facilitating coordination and making decisions complementary, and focusing on long term objectives.

Competitive advantage for a firm is the objective, the ability to outcompete rivals. Creating a vision, determining your direction, how you are going to be competitive, and building the skills and the organization to do it, that's strategy. At its core, strategy incorporate values, evaluating the market, evaluating yourself, building a credible business model based on the value provided to the customer, and choosing to deliver products and services to provide this value, whilst producing it at a profit. Core values are strong driver in strategy, showing the world who you are and whom you are not, and these principles have been shown to hold in a rapidly changing world.

Strategy in a Changing Environment

In the study of strategy up till the 1990s, the focus was profit, evolving into what we know as shareholder value. However, concepts such as CSR, governance, and more recently RBC and ESG, were emerging, and the subject of strategy has taken them into account.

Nowadays, strategy is facing a changing world. The focus of strategy is still on competitiveness, but with wider stakeholders, and societal impact, in a world of disruptive

technologies. New business models and strategies due to technological change, geographic and cultural trends are emerging, but also new business models due to changes in core values, exemplified by the developing frameworks which underlie CSR, RBC and ESG.

Whereas strategy in the 1970s and 1980s may well have focused on shareholder value, strategy in 2026 needs to focus on a company's business model and wider activities, and how these contribute both to shareholder value and, more widely, social needs. Customer value is now considered alongside reputation and reputational risk. Nowadays, strategy is concerned with broader issues than shareholder value, and this is manifested in the ethics of company activities, reporting of impact, and the strategy and the business model itself.

2) The Growth in Recognition of the Wider Responsibilities of Business

The Recognition of Stakeholders: The Contribution of CSR

The wider responsibilities of companies, both to the communities and environments in which they operate, and more widely to society, have emerged over the past few decades. In particular, both earlier work on governance and CSR have introduced and nurtured the concept of stakeholders.

CSR itself relates to a spectrum of company activities incorporates the treatment of employees, customers, suppliers, relations with investors, communities, NGOs, the government, the media, and environmental impact. Under CSR principles, any individuals or groups affected by a company's actions are considered stakeholders. These include internal stakeholders such as employees, the management, and of course shareholders. External stakeholders include customers, suppliers, communities, the government, and NGOs.

CSR was first mooted in the 1950s, has really contributed by identifying stakeholder groups, and recognizing a company's activities to mitigate negative impacts of a company's activities on these stakeholders. CSR nowadays is seen extending beyond the realms of responsibility to immediate stakeholders to the wider communities less directly impacted by the firms' activities, and in Cambodia many CSR activities go to outreach to schools,

health centers, groups and communities in the provinces. Many firms worldwide consider that good CSR is good for business, and the negative impacts of company behavior, can greatly harm a company's reputation. Strategy recognizes the importance of CSR, the intent of the company and the actions it takes. CSR are now considered much closer to a company's strategy, and an important component of the overall perceived value of a company to society.

Responsibilities in Company Actions: The RBC Framework

Responsible Business Conduct (RBC) is an internationally agreed framework, which focuses on actual business operations and management, based on the principle that businesses should proactively manage their impact on society, the environment, and the economy. RBC first appeared as a framework for business conduct in the OECD Guidelines for Multinational Enterprises in 1976 and first established the standards for environmental, social and human rights issues, which have since been adopted in ESG reporting. The latest revisions to the RBC framework were in 2023. According to the OECD, RBC is all about making sure that the activities of businesses and investors are aligned with the needs of society, and focuses on the operations of global supply chains and markets to reflect the needs of the societies.

RBC incorporates cooperation with governments, businesses and stakeholders to promote public policies, due diligence, and enhance access to remedies where standards appear to fall short of meeting the needs of societies. The 51 adherent countries to the RBC framework set up National Contact Points (NCPs) to build awareness and to contribute to the implementation of RBC principles in affiliated countries. In particular RBC includes actions which emphasize integrating sustainability and ethical practices into core business strategies and supply chains. RBC provides a framework, including guidelines for remedial actions for five areas:

- *Human Rights and Labor Standards*; including respect for human rights, decent work, freedom of association, collective bargaining, and such issues as the elimination of all forms of forced labor or child labor; equality and non-discrimination, ensuring fair treatment in employment and hiring practices

- *Environmental Responsibility*; including environmental protection, encouraging firms to take a proactive approach to environmental challenges
- *Business Integrity and Ethics*; covering anti-corruption, including extortion, bribery in all forms, transparency and disclosure
- *Stakeholder Engagement and Governance*; respecting all stakeholder interests, including employees, investors, and local communities
- *Social impact*; inclusive growth, consumer value, providing safe products and engaging with customers in a responsible manner.

By providing guidelines for companies to take actions to mitigate damage due to their own actions, and remedial actions to rectify transgressions, RBC has become a template for action towards transparency and accountability, with increasing attention from businesses, regulators and educators.

Assessing Sustainability for Investors: ESG Reporting

Environmental, Social and Governance Reporting (ESG), was first put forward in 2004 in a joint initiative report by financial institutions and the United Nations. ESG draws from earlier frameworks for Corporate Governance, such as the Cadbury Committee in 1991 in the UK, which established governance, including specific roles of non-executive directors as independent overseers of a company's business activities and impact on stakeholders. ESG draws from and overlaps with CSR and governance principles. ESG provides a specific measurable framework for investors to identify and evaluate the financial risks and opportunities of a company arising from issues related to sustainability and ethical performance. "Environmental" issues relate to such factors as impact on climate change, use and overuse of resources, impact on pollution. The "Social" component relates to such factors as employees, customer satisfaction, community relations, diversity and inclusivity. Governance issues relate to how the Board of Directors is structured, executive pay, transparency and the rights of shareholders. Nowadays, many firms provide ESG reports and some incorporate ESG and into their overall strategy, and is commonplace amongst Cambodian listed companies.

Where Do CSR, RBC and ESG fit into the Strategy Process?

Widespread adoption of frameworks, Governance, CSR, RBC and ESG and recognition of responsibilities to stakeholders, company actions, and reporting on sustainability and ethical performance are having an impact on strategy. CSR is seen as positive image and good for business, and also as a genuine way for companies to give back to society, something embedded in core values. RBC provides a code of conduct based on human rights and provides a fundamental guidance for firms on how to remedy situations where company's performance maybe considered out of line. ESG reporting is used to demonstrate wider impact on social sustainability issues and the environment to investors. These are all now seen as good for business or at the very least preserving reputational risk.

Each adds dimensions to the strategy process, and recognize the extent to which companies rarely act in isolation, that ecosystems in business exist and that costs and benefits are shared and spread. Nowadays it is valid to consider both shareholder value and stakeholder value. Measuring the impact on your stakeholders, the impact on the distinct groups a company benefits, such as schools in the provinces, women's or men's support networks, the environmental impact of CSR activities is now much more commonplace. CSR, RBC and ESG add dimensions to strategy because environmental and ethical impact are important and have consequences, and addressing the social needs of wider communities could also help develop markets in the future for products and services which also address needs such as the availability of banking services, insurance, education, transport, and access to healthcare to name but a few.

The Strategy Response: Creating Shared Value (CSV)

Creating shared value, first put forward by Michael Porter and Mark Kramer in 2011 brings the concepts forward to a strategic viewpoint, where a company makes a profit, but also directly provides a social need through its business model. Shared value, where you are directly doing good things for your customers by addressing social needs, whilst making a profit, directly focuses on the products and services that a company provides and the benefits

that these bring to individuals and communities. The more benefits that are provided through social impact the more willing people are to pay for them, whether it is education, financial services, healthcare, entertainment, culture, wherever society has a demand. Measuring the impact on both profitability and societal impact of the products or services the company provides is an emerging field. Measure the direct impact on health, education, local economy and any other results which could be deemed as being beneficial to social needs. The concept of CSV opens these doors for strategy to embrace.

3) A Shared Value Survey of Businesses in Cambodia

Attitudes to Social Impact: Surveys of Business Owners and Managers

At CamEd Business School we have undertaken surveys on strategy and shared value approaches in Cambodia since 2020. The following examples and quotations are taken from surveys 2020-24. The surveys have brought a very consistent set of results, that shared value approaches are commonplace in Cambodia and that many businesses see their commitment to internal and external stakeholders to be an important aspect to growing their businesses. Business sectors surveyed have been wide ranging, including interviews with business owners or managers in a diverse range of sectors in Cambodia, including:

- *construction and repair; road repair supplies, construction materials, auto repairs*
- *manufacturing; production of cotton and paper bags, sale of clean water to provincial locations, paper and packaging using waste and recycled paper, environmentally friendly char-briquettes (biofuels)*
- *drinks and food, instant noodles, sugar juice, beer production*
- *banking and finance; e-banking services, insurance*
- *trade and wholesale; import, export and logistics, e-commerce platforms connecting buyers and sellers, sales of refrigerators and air conditioners*
- *retail trades; diamond and jewelry retailers, natural and ethical beauty brands*

- *coffee shops and food retail; coffee franchises, tea and coffee shops and stations, mobile food delivery, restaurants, drinks, food and snacks providers*
- *travel companies; homestay living in Cambodian provinces, travel agents,*
- *healthcare providers; clinics and pharmacies with outreach to regions*
- *education; schools, and private education providers.*

Cambodian firms surveyed have included both the very small and the very large, with many being very young firms in their first years of business. Around 40% of firms considered themselves to be serving new and underserved markets, an important indicator in shared value where often the target groups of customers, often lower-income groups are target markets because they are underserved. A very high percentage of companies, well over 80% stated that they consider that they are addressing a social need through their business.

Examples have been providing through their business model (all are quotes from interviews and open-ended questions):

- *“Making healthcare more accessible to people with a lower level of wealth”*
- *“Providing healthy and fresh nutrition for people with concerns about their health”*
- *“Education and improvement to life through encouragement of house ownership and entrepreneurship (financial services)”*
- *“Safety need for customers, with production techniques having a positive impact on the environment, and job availability for poorer people”*

Over 90% of firms surveyed considered that their product or service would benefit the communities, with examples such as (quotes from business owners and managers):

- *“The company has created 180 jobs for the community”*
- *“People develop a deep understanding of illness and how to protect themselves, and could decrease spending on unnecessary medicines”*
- *“The company recycles used road facilities so they reduce the amount of waste products”*

-
- *“Since the shop is supporting the farmer and help with training in growing vegetables, the shop will also support the community by buying organic vegetables to use in the shop as ingredients for the food”.*

Amongst businesses interviewed may saw market expansion, including (quotes from interviewees):

- *“Increasing customers reach, increasing the loans taken out for smaller and medium sized businesses, improved technology and public awareness”*
- *“Increasing market demand in the understanding of health benefits from sugarcane drinks”*
- *“The on-going transactions and the number of customers using the App”*
- *“Reducing the unemployment rate, and improving staff soft skills”*
- *“Encouraging staff to reach their goals”*
- *“Providing good quality organic products”*
- *“To use domestic waste to produce cotton paper”.*

Since the surveys were undertaken (2020-24), there has been a strong and growing commitment to CSR in Cambodia, with many large and small firms undertaking outreach projects to address the needs of local communities, especially in education and in healthcare and for minority groups.

We see companies in the farming sector, banking sector, insurance and a wide range of sectors both targeting social needs such as access to basic services, and outreach to underserved markets, and new business models to share development costs and benefits throughout the business and sector eco-system, rather than focus on profit retention. There are examples in several sectors in Cambodia which exemplify creating shared value (CSV) principles, showing how business solutions can provide access to banking and financial services, education, healthcare, and where sectors such as farming can operate as ecosystems rather than competing business.

Cambodian shared value, CSR, RBC and ESG initiatives come from many sectors. For example, at the larger scale, inclusive insurance, banking and financial services, community outreach through pharmacies. Coffee shops providing good jobs with training for local people. Most of the companies in Cambodia have strong shared value principles, and this is very consistent with how strategy as a discipline is evolving to address both emerging markets and social impact.

4) Incorporating Changing Attitudes: An Opportunity for Cambodian Cases

How Does the Subject of Strategy Incorporate the Wider Responsibilities of Business?

Strategy is still based on the concept of competitive advantage, and this will remain. The emergence and growth of CSR, RBC and ESG and the concept of Creating Shared Value (CSV), are resulting in new business models which build competitive advantage, albeit in a changing environment where business is embedded in an ecosystem, where shareholder interests are still prevalent, but where stakeholder interests play far more of a role. Strategy tools and frameworks are, and will be used to assess more broadly the firm within its ecosystem, and turn ideas into competitive advantage. The environment for business is changing, but competitive advantage for firms and comparative advantage for countries will still remain, as will strategies to achieve them.

Building the skills and resources to achieve competitive advantage, assessing our own competitiveness as an individual is something that is being incorporated into teaching strategy. New areas of strategy directly focusing on social need, such as health economics and education provision, will most likely become mainstream. The fundamentals and the tools will stay the same, and some new ones will emerge. For example, cluster mapping, a core component of strategic analysis over the past three decades, overlaps with supply chain management, and will emerge again. New analytics to measure performance in RBC and ESG will have an impact on competitiveness, but competitive advantage will still be an ultimate goal in this new environment.

Conclusion: A Case for Cambodian Business Models?

Cambodia business models will have a very legitimate and mainstream presence in strategy teaching worldwide. Many businesses have incorporated the principles of Creating Shared Value in their business models and recognize the value of their business addressing social needs. CSR activities are very prevalent in Cambodia and provide another platform for companies to address broader societal needs, and RBC and ESG frameworks allow companies to benchmark their activities to be

consistent with the needs of societal needs. The surveys we have undertaken indicate that this is the case for both large and smaller businesses in Cambodia.

ESG is now undertaken by many companies in Cambodia, and new business models in sectors such as farming, banking, insurance, manufacturing, healthcare and pharmaceuticals, and even coffee shops are candidates for wider recognition. As strategy evolves so should the diversity of case studies, and we put forward Cambodia as a prime candidate for the next generation of case studies to incorporate into research and teaching in strategy, a core discipline in the next generation of business education worldwide.

References

- Charman. K.P. (2020). *Creating Shared Value in Cambodia*. In Dash, T.R., & Charman, K.P., (2020) Covid-19 The Economy and Society, Allied Publishers Pvt. Ltd. <https://doi.org/10.62458/CamEd/OAR/Symposium/2021/91-100>
- OECD (2023), *OECD Guidelines for Multinational Enterprises on Responsible Business Conduct*, OECD Publishing, Paris, <https://doi.org/10.1787/81f92357-en>
- Mares., R., and Young, S. (2025). *Textbook: Responsible Business Conduct in Cambodia*. Raoul Wallenberg Institute of Human Rights and Humanitarian Law, and Embassy of Sweden. <https://lup.lub.lu.se/search/files/173622504/2024-RBC-in-Cambodia-Textbook-compressed.pdf>
- Porter, M.E., and Kramer, M.R. (2011). *Creating Shared Value*, Harvard Business Review, Vol. 89, No. 1/2, pp. 62-77
- UN (2026). *The Ten Principles of the UN Global Compact*. <https://unglobalcompact.org/what-is-gc/mission/principles>
- World Bank (2004). *Who cares wins: connecting financial markets to a changing world* (English). Washington, D.C.: World Bank Group. <http://documents.worldbank.org/curated/en/280911488968799581>

Is AI bubble true or false? Early observation from investors in Cambodia, Singapore, China and Malaysia

*By Sereyrotana CHUM and others
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CamEd Business School*

1. Introduction

Artificial Intelligence (AI) is swiftly transforming the global tech landscape, positioning itself as one of the most impactful innovations of the modern era. Its influence spans multiple sectors - including healthcare, finance, logistics, and education - where it is driving progress, streamlining operations, and enabling new business approaches. Across Asia, nations such as Cambodia, China, Malaysia, and Singapore are actively integrating AI into their national strategies to boost economic growth and global competitiveness. These governments are channeling resources into AI development, fostering startup ecosystems, and attracting substantial foreign investment. This wave of enthusiasm reflects a widespread belief that AI will play a pivotal role in shaping future economies. Yet, this rapid expansion has also sparked concerns that the current investment boom may be fueled more by speculative excitement than by solid technological foundations. Observers are drawing parallels to past financial bubbles, notably the dot-com era, where exaggerated expectations led to significant market downturns. With AI company valuations climbing and media coverage amplifying the hype, questions are emerging about whether this growth is truly sustainable or vulnerable to collapse. This case study explores whether the current surge in AI investment across Asia is indicative of authentic economic advancement or a potential bubble. By examining investor perspectives and market trends in Cambodia, China, Malaysia, and Singapore, the study seeks to clarify the risks and opportunities that lie ahead in the region's AI journey.

II. Problem Statement

In the contemporary era, society is experiencing rapid technological advancement characterized by the continuous evolution of intelligent systems designed to enhance human convenience and efficiency - commonly referred to as artificial intelligence as AI technologies become increasingly integrated into daily life, a growing number of individuals and organizations have begun to place significant trust in their potential. With this perception, the current period of rapid progression in artificial intelligence (AI), often termed the AI boom, has profoundly impacted the broader economy and simultaneously fueled the theory of an ongoing stock market bubble. The market exhibits several classic indicators associated with asset inflation, where stock prices are pushed significantly higher by investor excitement and momentum rather than being anchored firmly to current intrinsic value or demonstrable fundamentals. This exuberance has resulted in a marked concentration of market capitalization among a limited number of firms. In the matter of fact - if artificial intelligence is in a bubble because an inflated perception of its value can lead to serious economic, social, and technological consequences when the large amount of money, attention, and trust are poured into AI projects that are not yet sustainable or fully understood, it creates unrealistic expectations about what the technology can actually achieve. Additionally, companies may invest billions of dollars chasing quick profits or following hype rather than focusing on genuine innovation or long-term impact, when the bubble eventually bursts - like previous tech bubbles, it could cause widespread financial losses, massive layoffs in the technology sector and a sudden drop in investor confidence. This could slow down meaningful AI research and development while it will make it harder for truly valuable and ethical AI projects to

get funding or public support. Beyond the financial risks, an AI bubble can also mislead governments, businesses, and society into over-relying on AI systems that may not be as reliable, safe, or fair as claimed. When the hype fades, the disappointment and mistrust that follow can harm the reputation of the entire field, delaying the responsible integration of AI into areas where it could genuinely improve lives, such as healthcare, education, and environmental management.

III. Literature Review

The global surge in artificial intelligence (AI) investment has sparked intense debate over whether this momentum reflects a sustainable technological transformation or an emerging speculative bubble. Recent analyses underscore both the tangible economic impact of AI and growing concerns about overvaluation and systemic risk. According to De Vynck (2025), major U.S. technology firms such as Google, Meta, Amazon, and Microsoft are projected to collectively invest more than USD 350 billion in AI data centers in 2025 alone - an unprecedented scale of spending in the technology sector. Economists estimate that this wave of capital expenditure could add up to 0.7 percent to U.S. GDP growth, suggesting that AI-driven investment is already reshaping macroeconomic performance. However, analysts caution that the U.S. economy's increasing reliance on a small number of dominant firms introduces systemic vulnerabilities should the AI boom decelerate. Critics draw parallels with previous speculative episodes, particularly the dot-com bubble, arguing that future profitability in AI remains uncertain as service prices fall and competition intensifies.

A similar concern resonates across Asia, where investor enthusiasm is fueling soaring AI start-up valuations. Ngui (2025) notes that according to GIC Chief Investment Officer Bryan Yeo, any start-up branded with "AI" is now being valued at extremely high multiples, often disproportionate to actual revenue or technological capability. While such exuberance underscores optimism about AI's transformative potential, it also signals a risk of speculative excess in emerging Asian markets such as Singapore, Malaysia, and Cambodia, where global hype may outpace sustainable fundamentals. Echoing this caution, former Intel CEO Pat Gelsinger (2025) acknowledged that the current AI-driven market already

exhibits bubble characteristics, though he expects it to persist for several years before any correction occurs. He argues that genuine breakthroughs and profitability from AI technologies will materialize later in the decade, suggesting that the bubble phase may coexist with long-term technological maturation. Similarly, Reuters (2025) reports a sharp divide among experts: while the Bank of England and tech leaders like Jeff Bezos and Bryan Yeo warn of overfunding in unproven ventures, others, including Goldman Sachs economist Joseph Briggs, contend that the spending remains grounded in sound business fundamentals. Despite this polarization, investor confidence remains remarkably high - over 90 percent of investors continue to channel funds into AI initiatives. Empirical research adds nuance to this debate. Using econometric tools such as the Generalized Supremum Augmented Dickey-Fuller (GSADF) and Markov-Switching GARCH (MS-GARCH) models, Jung and Cho (2025) found that only a limited subset of companies - most notably NVIDIA and Tesla - displayed bubble-like price dynamics. In contrast, other major AI-related firms like Meta and Palantir did not exhibit the same speculative patterns, implying that while exuberance exists, it is not pervasive across the sector. Supporting this interpretation, Koundinya (2025) argues that unlike the late-1990s dot-com bubble, today's AI market remains anchored in measurable productivity gains and strong cash flows. Nonetheless, some analysts warn that inflated expectations and slowing earnings growth could threaten sustainability. Reports indicate that since the launch of ChatGPT, AI-related stocks have dominated S&P 500 returns and contributed significantly to GDP growth - adding approximately 1.1 percent in early 2025. Yet, experts such as David Siegel and MIT researchers suggest that many AI Page 2

systems are less capable than public perception implies, and firms have yet to realize consistent returns on investment (Yale School of Management, 2025). This raises questions about whether market enthusiasm exceeds actual technological readiness. At the regional level, Cambodia's AI development presents a contrasting narrative. Unlike the speculative tendencies observed in major economies, Cambodia's AI landscape is in its formative stage, focusing on sustainable and inclusive growth. Reports from Chhem, S. (2024, June 20) and Ministry of Industry, Science, Technology & Innovation. (2023) describe government-led initiatives centered on

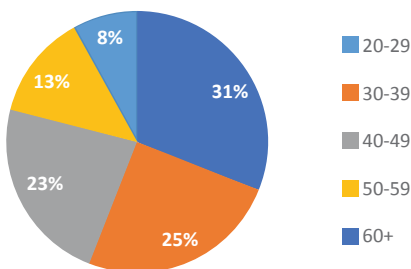
ethical governance, skill development, and international cooperation. The draft National AI Strategy 2025–2030 emphasizes human-centered and equitable AI adoption, aligning with UNESCO’s global readiness framework. This strategic orientation positions Cambodia to pursue long-term digital transformation while mitigating the risks of speculative overinvestment seen elsewhere.

In sum, the literature reveals a complex picture. While global AI investment is driving genuine economic growth and innovation, it also displays hallmarks of speculative behavior - particularly in inflated valuations and concentrated market power. The evidence suggests that AI’s expansion is real but fragile: an engine of productivity underpinned by transformative potential yet shadowed by the cyclical tendencies of financial exuberance. The challenge for policymakers and investors lies in distinguishing sustainable technological advancement from speculative excess to ensure that the AI revolution delivers lasting, inclusive prosperity.

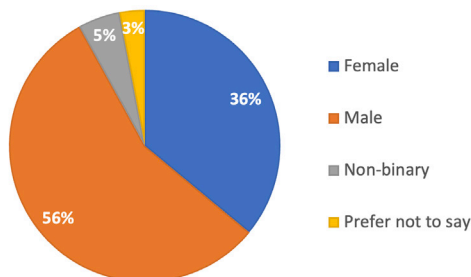
IV. Data Collection (Survey)

The survey of 39 investors from Cambodia, China, Singapore and Malaysia has shown the result as follows.

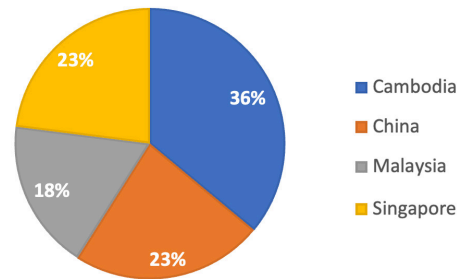
1. Age:



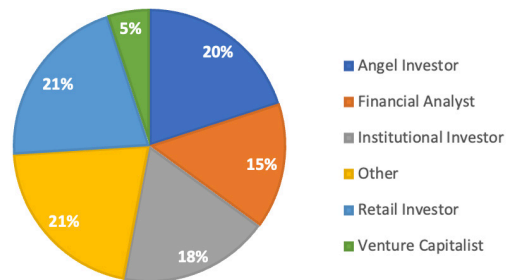
2. Gender:



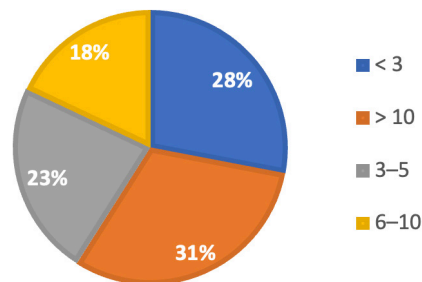
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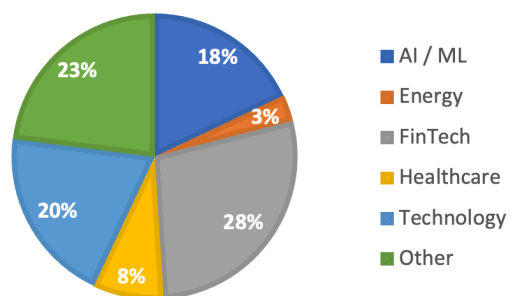
4. Primary role:



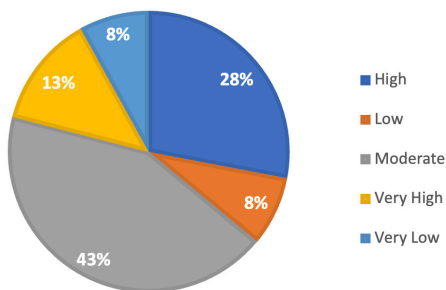
5. Years of Investment Experience:



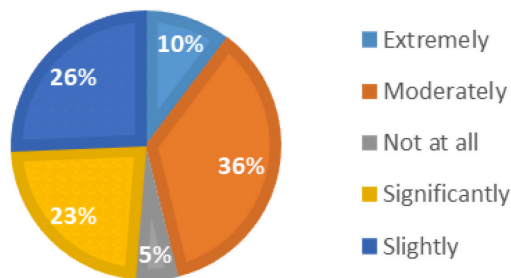
6. Main Sector of Investment:



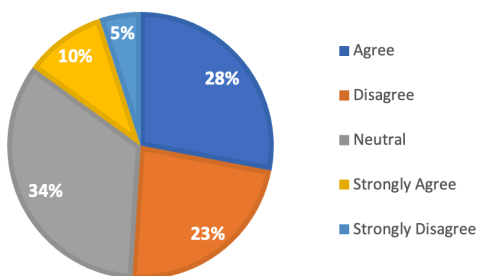
7. How would you rate your overall knowledge about AI technologies?



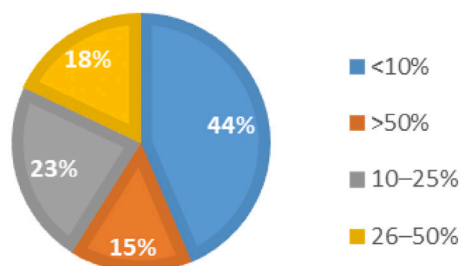
11. How has media coverage influenced your perception of AI investment opportunities?



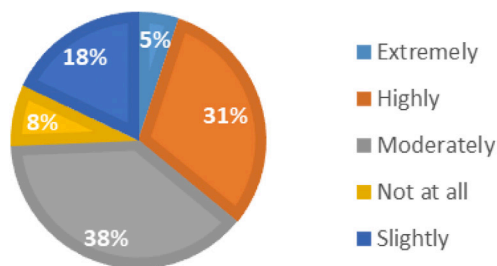
8. Do you believe current valuations of AI-related companies reflect their true long-term potential?



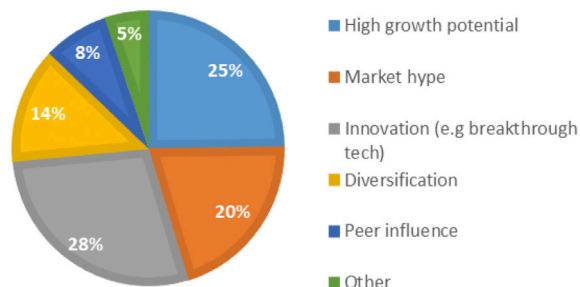
12. What percentage of your portfolio is AI-related?



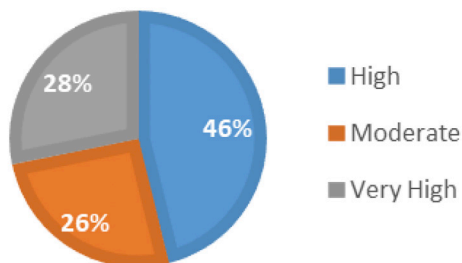
9. Compared to other tech sectors, how overheated do you perceive the AI investment market to be?



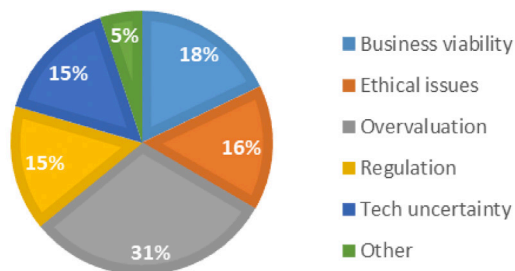
13. Main motivations for AI investments:



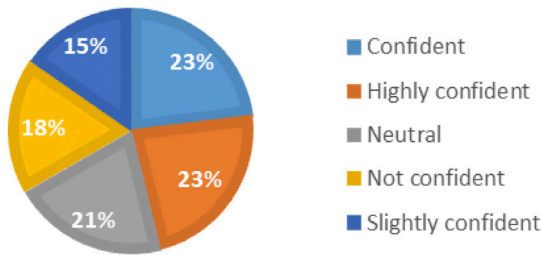
10. To what extent do you believe AI represents a long-term transformation rather than a short-term trend?



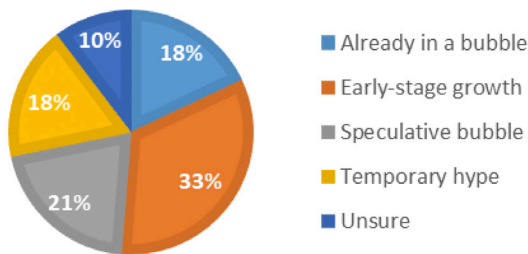
14. Main concerns about AI investments:



15. Confidence in sustainable AI investment returns:



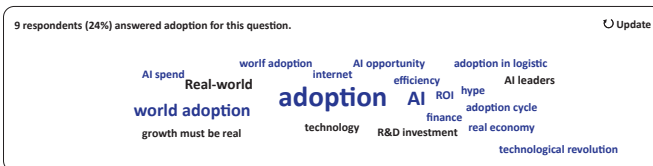
16. How would you describe the current state of the AI investment market?



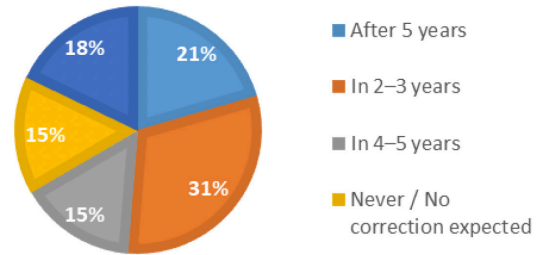
17. If you see the AI market as a bubble, please describe the specific indicators or behaviors that suggest a bubble. (e.g., excessive valuations, rapid funding cycles, lack of product market fit)



18. If you see the AI market as NOT a bubble, please describe the evidence or trends that suggest that AI is a sustainable, transformative technology. (e.g., real-world adoption, profitability, long-term R&D investments)



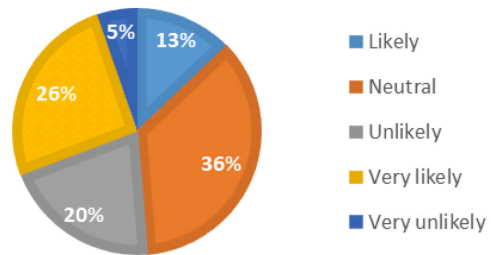
19. When do you expect a potential correction or stabilization in the AI market?



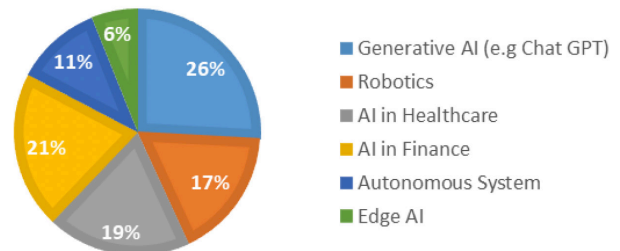
20. What external factors could influence the sustainability of AI growth? (e.g. government policy, talent availability, infrastructure, global competition)



21. How likely are you to increase AI investments in the next 12 months?



22. Which AI subfields have the highest long-term potential?



In conclusion, the AI bubble is partially true. Certain sectors, particularly generative AI start-ups, exhibit speculative valuations that exceed their current technological maturity, yet the broader AI market in Asia remains anchored in tangible progress, practical applications, and policy-driven support. To sustain growth and mitigate bubble characteristics, stakeholders should prioritize responsible innovation, diversify portfolios, invest in talent development, and enforce robust regulatory frameworks. Balancing enthusiasm with prudence will be critical to ensuring AI delivers inclusive and sustainable economic benefits across the region.

Chhem, S. (2024). Cambodia's AI future: Steering ethical and inclusive development (AVI Commentary, Issue 05). Asian Vision Institute. <https://asianvision.org/wp-content/uploads/2024/06/240620-AVI-Commentary-2024-Issue-05-Chhem-Siriwat.pdf>

Ministry of Industry, Science, Technology & Innovation. (2023). AI landscape in Cambodia: Current status and future trends. Policy Pulse. <https://policypulse.org/wp-content/uploads/2023/06/AI-Landscape-in-Cambodia.pdf>

List of References

De Vynck, G. (2025). The AI spending boom could have real consequences for the U.S. economy. The Washington Post. <https://archive.ph/20250826191316/https://www.washingtonpost.com/technology/2025/08/04/big-tech-ai-spending-economy>

Ngui, Y. (2025). AI startup valuations raise bubble fears as funding surges. Reuters. <https://www.investing.com/news/stock-market-news/ai-startup-valuations-raise-bubble-fears-as-funding-surges-4269874>

Gelsinger, P. (2025). Former Intel CEO Pat Gelsinger: "Of course" we're in an AI bubble. CNBC. <https://www.cnbc.com/video/2025/10/13/former-intel-ceo-pat-gelsinger-of-course-were-in-an-ai-bubble.html>

Reuters. (2025). Factbox – Opinions split over AI bubble after billions invested. U.S. News & World Report. <https://money.usnews.com/investing/news/articles/2025-10-16/factbox-opinions-split-over-ai-bubble-after-billions-invested>

Jung, W., & Cho, H. (2025). Is the AI bubble real? A time series analysis on unit root process and volatility of financial bubble dynamics. SSRN. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5340813

Koundinya, S. (2025). We may not be in an AI bubble, reveals report. Analytics India Magazine. <https://analyticsindiamag.com/ai-news-updates/we-may-not-be-in-an-ai-bubble-reveals-report>

Yale School of Management. (2025). This is how the AI bubble bursts. Yale Insights. <https://insights.som.yale.edu/insights/this-is-how-the-ai-bubble-bursts>

Advancing Disability Inclusion and Menstrual Health: A Global Imperative for Equity and Dignity

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Abstract

The Royal Government of Cambodia's launch of the National Strategic Plan on Disability (2024–2028) marks a significant milestone in Southeast Asia's pursuit of social inclusion and equality. This initiative aligns closely with global commitments to the United Nations Sustainable Development Goals (SDGs), particularly SDGs 3, 4, 5, 10, and 17. Drawing from the first global doctoral study on menstrual hygiene management (MHM) for adolescents with intellectual disabilities, this article explores how inclusive health and education frameworks can address the persistent marginalisation of girls and women with disabilities. The study, based in South Africa, used the Social Model of Disability to highlight systemic barriers to MHM and offered a framework adaptable across global contexts. Cambodia's renewed strategy demonstrates a regional commitment to ensuring that persons with disabilities live with dignity and participate fully in inclusive societies. This article argues for the integration of MHM into national disability and education policies globally, reinforcing the principle that no one should be left behind.

Introduction

On October 23, 2025, Minister of Tourism Huot Hak announced Cambodia's National Strategic Plan on Disability for 2024–2028, reaffirming the government's dedication to promoting the rights and inclusion of persons with disabilities. Speaking on behalf of the Royal Government of Cambodia, Minister Hak emphasized that disability inclusion remains a long-standing national priority, rooted in the principle of "no one left behind."

This principle echoes the spirit of the United Nations 2030 Agenda for Sustainable Development, which calls upon all nations to uphold human dignity, equality, and inclusion as universal rights.

Cambodia's new five-year plan represents a continuation of the reform agenda championed by both former Prime Minister Hun Sen and current Prime Minister Hun Manet. Its core vision is to ensure that persons with disabilities of all ages can live with dignity and participate fully in an inclusive society that values diversity and human rights. This policy direction holds relevance not only for Cambodia but also for global discussions on inclusive education, health equity, and gender-sensitive disability policies.

The launch of this national strategy coincides with emerging global evidence underscoring the need to include MHM within the broader disability inclusion agenda. Globally, MHM remains one of the least addressed aspects of public health policy, particularly for adolescent girls and women with intellectual disabilities. The onset of menstruation can be bewildering for these adolescents, often compounded by social stigma, cultural taboos, and inadequate educational resources. The absence of appropriate support systems places a significant emotional and logistical burden on families, caregivers, and educators.

This research, conducted in South Africa, explored the knowledge, attitudes, and experiences of MHM among adolescent girls with intellectual disabilities and their caregivers. Using the Social Model of Disability as a theoretical lens, the study identified systemic barriers that prevent these adolescents from managing their menstrual health effectively. The research, the first of its kind globally, provides a comprehensive framework for policymakers, educators, and health professionals to design inclusive programmes that promote dignity, autonomy, and well-being.

The Global Context of Disability and Inclusion

Disability inclusion has become a defining priority within global human rights and development discourse. According to the World Health Organization (WHO, 2022), over one billion people, or approximately 16 percent of the world's population, live with some form of disability. Among them, women and girls face additional layers of discrimination due to intersecting gender, social, and cultural barriers. In developing countries, these barriers are often amplified by limited access to education, inadequate infrastructure, and persistent stigma surrounding disability and menstruation.

The Royal Government of Cambodia's commitment reflects a regional alignment with the Convention on the Rights of Persons with Disabilities (CRPD), ratified in 2012. The National Strategic Plan on Disability (2024–2028) reinforces Cambodia's dedication to human rights, equality, and inclusive development. The plan's objectives, which include accessibility enhancement, social protection, and inclusive education, align directly with SDG 10 on reducing inequalities and SDG 5 on gender equality. By ensuring that persons with disabilities are active participants in society, Cambodia sets an example for nations seeking to balance economic growth with social responsibility.

However, one of the critical areas requiring deeper integration within disability policy frameworks worldwide is MHM. Despite its profound implications for gender equality, public health, and education, MHM has remained largely absent from mainstream disability policy. This research provides evidence that addressing this gap can transform the lives of countless adolescents and families, particularly in low- and middle-income countries.

The First Global Study on Menstrual Hygiene Management and Intellectual Disability

The study conducted in South Africa examined the lived experiences of adolescents with intellectual disabilities, their caregivers, and educators in a public school. It drew on qualitative data gathered through in-depth interviews and focus group discussions, offering a human-centred perspective on the intersection between disability, gender, and health. The analysis revealed that most caregivers lacked access to reliable information or formal

training on MHM. Educational institutions were often ill-equipped to provide appropriate support, while cultural taboos continued to reinforce silence and shame around menstruation.

Using the Social Model of Disability as the guiding framework, the study challenged the traditional medicalized view of disability, shifting the focus from individual limitations to systemic and social barriers. The findings underscored that poor MHM practices were not a result of individual incapacity but rather of insufficient institutional support, inadequate policy frameworks, and cultural misconceptions. This theoretical lens offers a transformative way to design inclusive interventions by reframing menstruation as a social and rights-based issue rather than a private or biological concern.

The study's significance extends beyond South Africa. It stands as the first global research effort addressing MHM among adolescents with intellectual disabilities. Its recommendations can be adapted to different cultural and policy contexts worldwide, including Cambodia's current disability strategy. Implementing these insights globally would advance multiple SDGs simultaneously, strengthening commitments to gender equality, quality education, and reduced inequalities.

Aligning National Policy with Global Commitments

The Cambodian National Strategic Plan on Disability demonstrates a clear alignment with the SDGs, particularly in its call to ensure dignity, participation, and inclusion for all citizens. Its focus on accessibility within the tourism sector illustrates the country's holistic approach to inclusion, acknowledging that persons with disabilities must have equal opportunities to participate in all aspects of life, from education to employment and leisure.

For this policy to reach its full potential, MHM must be integrated into national frameworks for education and healthcare. By incorporating MHM into disability policies, governments can ensure that adolescent girls with intellectual disabilities receive tailored education, appropriate support, and access to safe and affordable menstrual products. While this research recommends access to diverse menstrual resources, its primary emphasis lies in caregiver empowerment, educational inclusion, and community awareness rather than product distribution.

Countries seeking to advance disability inclusion can draw from Cambodia's example by establishing cross-sectoral partnerships that engage ministries of health, education, and social affairs, as well as civil society and the private sector. This aligns directly with SDG 17, which emphasises partnerships for achieving sustainable development. By bringing together multiple stakeholders, nations can develop culturally sensitive interventions that dismantle stigma and empower individuals with disabilities to live with confidence and dignity.

Education, Empowerment, and the Role of Caregivers

Education remains the cornerstone of inclusion. My research found that when caregivers, educators, and healthcare professionals receive adequate training and information, adolescents with intellectual disabilities experience greater autonomy and self-esteem. In many communities, menstruation remains a taboo subject, often shrouded in silence. Breaking this silence requires not only awareness campaigns but also the creation of safe, inclusive learning environments where adolescents can ask questions and learn without fear or shame.

Cambodia's emphasis on inclusive education within its disability plan provides an opportunity to incorporate MHM education into school curricula. By equipping teachers with the necessary training to address menstrual health sensitively and inclusively, the education system can empower schoolgirls to manage their health confidently. This aligns with SDG 4, which calls for inclusive and equitable quality education for all. Education that embraces diversity and promotes understanding of natural biological processes contributes directly to the reduction of stigma and the improvement of public health outcomes.

Global Implementation and Future Directions

The insights from the first global study on MHM for adolescents with intellectual disabilities should inform disability and health policies across all regions. The framework developed through this research can guide the creation of inclusive systems that address the intersectionality of gender, disability, and education. The global community must recognize that MHM is not merely a personal issue but a public health and human rights priority.

To ensure long-term impact, national strategies should embed MHM within existing disability and education policies, supported by continuous monitoring and evaluation. This requires collecting data, establishing indicators of progress, and incorporating feedback from adolescents, caregivers, and educators. When MHM becomes an integral part of disability inclusion strategies, it contributes not only to personal well-being but also to social cohesion and economic productivity.

Implementing these principles globally would represent a transformative step toward achieving the SDGs, especially those focused on health, education, and gender equality. It would also reinforce the central message of Cambodia's disability plan: that no person, regardless of ability or circumstance, should be excluded from opportunities to thrive.

Conclusion

Cambodia's new National Strategic Plan on Disability (2024–2028) arrives at a pivotal moment in global development discourse. Its vision of inclusion, accessibility, and human dignity resonates deeply with international efforts to uphold the rights of persons with disabilities. The plan embodies the global principle of “no one left behind,” reaffirming the need for holistic strategies that address both physical accessibility and social inclusion.

The first global study on MHM for adolescents with intellectual disabilities contributes a critical missing piece to this global puzzle. By integrating MHM into disability frameworks, policymakers can ensure that girls and women with intellectual disabilities are not overlooked in public health and education reforms. The study's findings and recommendations offer a universal framework that should be implemented across nations, reinforcing the SDGs and fostering equity, empathy, and empowerment.

As Cambodia takes decisive steps toward disability inclusion, it also sets a precedent for integrating gender and health into social policy. When nations prioritize inclusive education, empower caregivers, and dismantle cultural taboos, they create societies that truly embody the ideals of the United Nations 2030 Agenda. The path forward demands collective action, informed policy, and sustained commitment—because the measure of a nation's progress lies not only in economic growth but in how it uplifts its most vulnerable citizens.

References

United Nations. (2015). *Transforming Our World: The 2030 Agenda for Sustainable Development*. New York: United Nations.

World Health Organization. (2022). *World Report on Disability*. Geneva: WHO.

Royal Government of Cambodia. (2024). *National Strategic Plan on Disability 2024–2028*. Phnom Penh: Ministry of Social Affairs, Veterans, and Youth Rehabilitation.

Ramjawan, S. (2025). *Improvement of Menstrual Hygiene Management (MHM) for Intellectually Disabled Adolescents in a Public School in South Africa*. Doctoral Dissertation, Honoris United Universities.

The Rise of Family Trusts in Cambodia: Building Legacy in an Emerging Market

*By Hans Chen
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Introduction

In the last twenty years, Cambodia's steady economic growth has been fueled by political stability, a welcoming environment for foreign investors, and increased cooperation with regional and global markets. As a result, private wealth has grown, especially among families who own businesses. Many of these families are first-generation entrepreneurs who began their ventures after Cambodia's post-conflict recovery.

When families are building wealth, ownership is usually simple and centralized. Business owners typically keep assets in their own names and make all major decisions. This setup works well during rapid growth, but it can become less effective as businesses and families get bigger. As complexity increases, informal structures often struggle to support long-term continuity.

As Cambodia's economy develops, more families are facing real questions about succession, protecting assets, and ensuring long-term stability. These are immediate challenges that can impact both family relationships and business success. That's why family trusts are becoming a practical and increasingly relevant legal option for Cambodian business owners.

Evolution of the Trust Framework in Cambodia

Cambodia's trust framework officially launched in 2019, followed by the Law on Trust, new regulations, and the creation of the Trust Regulator. This framework aims to provide legal certainty, transparency, and oversight for trust activities, making the environment more attractive for investors and private wealth holders alike.

While the trust sector is still new, the idea of trusts is not unfamiliar in Cambodia. In 2013, Sub-Decree No. 476

introduced financial trusts, mainly used by development partners to help the banking and microfinance sectors. These early examples showed that trusts could work well in Cambodia's legal system with the right rules and oversight.

Building on this success, the Law on Trust expanded trust operations to cover personal, commercial, public, and social trusts. This change created a legal base for trusts in asset holding, wealth management, family succession, and long-term planning. The law also highlights the importance of licensed trustees and trust registration, clearly distinguishing formal trusts from informal arrangements.

Economic and Social Drivers of Family Trust Demand

Cambodia's economic growth has increased the number of wealthy individuals, many of whom started family businesses that provide income for their families and jobs for local workers. As these businesses expand, relying too much on the founder becomes a major risk.

Unexpected events like illness, accidents, disputes, or lawsuits can disrupt businesses and create uncertainty for employees, partners, lenders, and regulators. Without a solid succession plan, families or companies may face problems running the business or disagreements over ownership. Family trusts help manage these risks by separating ownership from daily management while keeping family interests in mind.

Cambodian families now face more cross-border or overseas arrangements. Children often study abroad, family members may have different residencies or nationalities, and assets are spread across several countries. Traditional inheritance methods usually can't handle these challenges. A well structured trust can provide continuity and protection across multiple legal systems.

The Role of Family Trusts in Wealth Preservation

Family trusts do more than just help with legacy planning. They also protect assets, support good governance, and help with long-term financial planning. With the right setup, families can set clear rules for managing assets, sharing income, and defining beneficiary rights. These rules are written in the trust deed to avoid confusion, prevent disputes, and keep things running smoothly if the trust creator can't manage the trust directly.

Trusts can hold shares in family businesses and help prevent ownership from becoming too divided. Creators can set rules for voting rights, dividend policies, and management succession ahead of time, which supports professional management and long-term growth. This is especially important for businesses that need stable ownership to keep good relationships with banks and partners.

Types of Trusts Applicable to Family Planning

Cambodian law usually classifies family trusts as personal trusts. These are meant to serve the needs of individuals or families, not just business goals. In practice, family trusts can hold shares in family businesses, manage real estate in different places, protect savings and investments, provide financial support for spouses, children, or elderly relatives, and help plan for inheritance or unexpected events. Family trusts in Cambodia need to follow local legal rules and registration steps closely. While international experience offers useful guidance, trust structures should always be tailored to the specific needs, values, and circumstances of each family. Trustees can learn from other countries where these structures are more common and developed. Using the same approach for every family rarely works well.

Governance and Control Considerations

Many people worry about losing control of their assets when they set up a trust. In reality, trust deeds can be designed to balance control with the trustee's responsibility to act in the best interest of the family. Families can set up governance tools like protectors, family councils, or advisory committees. With these in place, families keep some influence while making sure trustees follow the law and the trust's goals. Clear rules also make things more transparent and accountable for everyone involved.

Challenges in Developing Family Trusts in Cambodia

Even though family trusts offer many benefits, setting them up in Cambodia still comes with challenges. One major issue is that many people don't know much about trusts. Some families think trusts mean giving up control on assets or see them as foreign ideas that don't fit local customs.

There are also practical steps to consider. Trusts must be registered to be legally effective, and asset transfers need to be coordinated with authorities like land and tax offices. Trust creators should work closely with licensed trustees, lawyers, and banks to make sure everything is done correctly.

Trust Registration and Asset Protection

Registering a trust is essential for asset protection under Cambodian law. A trust only takes effect after it is registered with the Trust Regulator, which keeps trust assets separate from the trustee's personal assets. Registered trusts must follow rules for supervision, reporting, and ongoing compliance. This helps keep things transparent and protects the interests of beneficiaries. For families, registration provides confidence that assets will be managed in accordance with the trust deed and protected from unnecessary risk.

The Role of Professional Trustees

Trustees are key to running family trusts. They handle asset management, make sure the trust follows the rules, keep records, report as needed, and work with regulators and banks to keep the trust running smoothly.

A licensed trustee offers neutrality and stability, especially if family members disagree or can't manage assets themselves. The trustee also helps maintain stability during generational transitions, ensuring the trust's goals are met over time, allowing the trust's purpose to be preserved across generations.

Future Outlook for Family Trusts in Cambodia

As Cambodia's economy grows, more families and long-term foreign residents will need help with wealth management and succession planning. Family trusts are a practical way to meet these needs.

Ongoing improvements in regulations, better training, and more public education are key to growing the trust sector. Closer cooperation between banks, auditors, and regulators will also build trust in these arrangements.

Setting up a family trust does not replace entrepreneurship or family leadership. Instead, trusts offer a solid framework for long-term stability and smooth succession. In Cambodia's emerging market, family trusts can play an important role in preserving family wealth while contributing to sustainable economic development.

Conclusion

Family trusts are emerging as a timely and practical response to the evolving needs of Cambodian business families. As wealth structures become more complex and family enterprises span generations and borders, trusts offer a regulated and flexible framework for asset protection, governance, and succession planning. With continued regulatory maturity and professional support, family trusts are well-positioned to become a cornerstone of long term.

Prospects for the Biofuels Sector in Cambodia: The Opportunities and the Trade-Offs

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Biofuels: Perceptions of the Future

Biofuels are seen as an industry of the future, as well as the present and the past, representing both the origin of fuels for heat, for transport, and nowadays as a potential replacement, at least in-part for fossil fuels in the generation of electricity. Although thought of as a marginal contributor, biofuels are widespread, contributing nearly 30% of total fuel consumption in Cambodia, much of which is for domestic consumption in rural areas. Several industries, including the garment sector, choose to replace fossil fuels with biofuels for heat generation for industrial processing, reflecting the well-espoused principle of switching away from fossil fuels. In addition to having the potential to replace fossil fuels, biofuels present potential opportunities for exports, especially to regions such as the EU, which have specific targets to increase biofuel usage. Development of biofuels can also provide jobs, particularly in rural areas with the growth of biofuel crops and collection and processing of agricultural waste. Furthermore, biofuels have the potential for increasing farm incomes by generating another source of income by growing additional crops such as jatropha from which oil can be extracted to make biodiesel.

Many countries are considering the same opportunities and prospects, and particularly ASEAN countries, as each, with the exception of Brunei and Singapore, has a large agricultural sector, and the potential to produce biofuels on a large scale, or a small scale at the individual farm level. The biofuel industry has expanded greatly in countries such as Indonesia and Malaysia, which have focused on biodiesel based on palm oil production, and

Vietnam, which has focused primarily on ethanol derived from cassava, sugar cane and agricultural residues such as rice husks.

Guidelines and policies are developing worldwide as the impetus for biofuel usage grows, and organizations such as the Food and Agriculture Organization of the UN, have been proactive in producing guidelines and policy frameworks. The primary reason for this is that biofuels come at a cost. Growing crops for fuel will create competition for land that would otherwise be used for growing crops for food, impacting food security. Environmental impacts such as deforestation are seen as risks. It is the trade-offs between the benefits of biofuels, replacing fossil fuels and potentially creating incomes, versus the costs of biofuels potentially replacing food crops, the competition for land space this represents and the environmental impacts that could result from switching significant areas of land to biofuel production.

Biofuels: A Renewable Energy?

Biofuels are a form of renewable energy, as are solar energy, wind power, geothermal energy hydropower, and energy from the oceans and moving water. At a practical level renewable energy is not depleted, as it is renewed or is available in sufficient supply that there is no risk of depletion. Biofuels, although renewable, would have to regenerate. Wind and solar power are, within reason, available constantly, although this depends on windy days and sunny days. Biofuels, taken from biomass, have to regenerate year on year. Energy from biomass has to regrow, and appear in the form of agricultural waste, crop residues, or specific crops and plants grown for the purpose of biofuel. In this sense, this makes the land the prime resource, as biofuels need to take up land space for a given period of time, usually a year, to regenerate. Land is very much the scarce resource.

What are the Sources of Biofuels?

Sources of biofuels are generally classified into four generations, food crops, non-food crops, algae, and engineered biofuels which are used to make synthetic gases.

First generation biofuels are derived from edible crops, which contain high levels of sugar or starch, or vegetable oil. These include sugar cane, sugar beet, cassava, wheat, corn, rapeseed, palm oil and potatoes. Sugar and starch-based crops are a feedstock for ethanol, and oil-based crops are a feedstock for biodiesel. Production of first-generation biofuels directly impacts food supply, having the potential to drive up prices of foods if this results in a food shortage, and require large amounts of fertile land and water.

Second generation biofuels are derived from non-edible plant materials and agricultural waste, focusing on the tough fibrous part of the plant (lignocellulosic biomass). These include wood chips, rice husks, cashew nut skins, wheat-straw, corn stover (husks/stalks), perennial grasses, and also municipal solid waste. Also included are inedible crops such as jatropha, tung and castor bean, which can be grown specifically for biofuel. Second generation biofuel crops provide a feedstock for cellulosic ethanol or renewable diesel. These do not compete with food crops, and can be used as a complement to food crops, such as using rice husks to generate heat or electricity, now increasingly common in Cambodian industry. Non-food crops such as jatropha can be grown at large scale or small scale on marginal land where food crops do not thrive.

Third generation biofuels comprise algae and related micro-organisms which are extremely valuable as a potential source of biofuels as they grow very fast and contain a very high oil content. Feedstocks include microalgae and macroalgae (seaweed). Algae can produce 10-100 times the amount of fuel per unit of land that can be produced from traditional food or non-food crops, and they have a much more limited requirement for land, and so have limited impact on food security. Algae can also be grown in waste water and salt water, so do not require fresh water. Algae can be processed into biodiesel, biobutanol and aviation (jet) fuel, with by-products such as animal feed, fertilizer and nutritional supplements.

The fourth-generation biofuel are the “engineered” biofuels, derived from synthetic biology and carbon capture using genetically modified organisms (GMOs) to maximize the fuel output. Feedstocks include bioengineered algae, plants and captured CO₂ and industrial exhausts which can be converted directly into biofuel using solar energy. Fourth generation biofuels are designed to be carbon-negative, and most are still in the research and development phase but these are likely to have a high profile in the near future with expected technological process especially in the area of carbon capture.

What is the Potential of Biofuels for Cambodia?

Biofuels are used significantly in rural areas of Cambodia for domestic heat, in the form of charcoal. Several industries, such as the garment industry also use biofuels for the production of heat for industrial processing. A total of 30% of all Cambodia’s energy consumption is estimated to be taken from biofuels in these ways.

Biofuel energy is used for creation of electricity, mainly through burning agricultural waste products, wood fuels, and rice husks, of which Cambodia produces 1.6 million tons annually. Electricity production is primarily generated from hydropower and imported coal, and fuel for transport is entirely imported fossil fuel.

However, there are also some industrial facilities such as sugar and rice mills which produce electricity from biofuels, and small off-grid-projects to use crops such as jatropha, or biodigesters at the household level to generate electrical power for local communities. At the local level, some projects promoted by the MAFF have introduced biofuels to local communities using biodigesters, which can be used for local heating and power generation, although the returns on the initial cost of biodigester have yet to be shown to profitable in some cases.

There is significant potential for biofuels in Cambodia. Crops such as jatropha can be potentially used as it can grow in areas of marginal production, at small farms level or at plantation level, with the possibility of generation of up to 20kg of oil per plant per annum. This could be a form of biofuel suitable at either small farm or plantation level. Certain algae farms exist, but this is not a big industry in Cambodia currently. Export opportunities exist with the genuine aim of developing an export oriented or import

substitution biofuels sector, with possibilities for small scale revenue generation, local electricity production.

The Potential Impact of Biofuels

Switching to biofuels can reduce reliance on energy imports, particularly in the form of local energy projects and small-scale electricity production from biomass. This can lead to increased farm incomes, availability of jobs and potentially can contribute to poverty reduction in rural areas. But switching to biofuels could also result in an adverse impact on food supply and food security by increasing the demand for and competition for land, and could also risk deforestation and potential over use of agricultural waste for the production of biofuels. Whether or not the climate is positively or negatively affected by biofuels is not yet clear as reduction of greenhouse gases in growing biofuels is countered by the release of carbon and the additional use of fossil fuels in extracting and processing biofuels.

The impact on climate change is hotly debated. Whilst biofuels absorb carbon during growth, the process of conversion of wetlands, grasslands and forests for biofuel production can release large amounts of carbon into the atmosphere. The manufacturing process for biofuels is energy-intensive and would often involve fossil fuels for fuels, production of fertilizer, irrigation and refining and blending. Requiring large amounts of water and fertilizers could lead to water depletion. There are many environmental issues related to biofuels and the jury is out. There are social issues and potential trade-offs as well that come from competition over scarce resources such as land. As this affects the wellbeing of farmers and communities, attention to ESG and international standards for RBC helps create needed safeguards. The UN Guiding Principles on Business and Human Rights and the OECD Due Diligence Guidance for RBC are important reference points to identify and manage trade-offs around biofuel production.

Policy and Regulatory Framework for Biofuels

Whether small or large scale, investment in infrastructure is required, and finance for investment is a subject of government policy. For an objective based on small-scale adoption of biofuels, cooperatives, local electricity production facilities, and biodigesters at the individual household level would be key. For large-scale objectives

a supply chain is necessary, including refining and blending facilities. Determining objectives of policy for biofuels and financing the infrastructure needs is a primary objective of policy. Standards need to be set (e.g. ethanol 5%) for cars, and a regulatory framework created which provides the incentive and the cost and tax structure, which provides the incentives to produce biofuels without making them so attractive as to create competition for land.

Cambodian Policy for Biofuels

Cambodian Policy for biofuels had been focused on market signals and local coordination rather than specific policy towards promoting biomass energy. Biomass energy has been incorporated into the Power Development Plan 2022-2040, which has prioritized expansion of renewable energy resources including solar, wind, biomass and hydropower, and provides incentives for local initiatives. There are only about two companies actively farming biomass energy at the moment, but the 2020s is seeing a renewed interest in the biofuels sector.

ASEAN Policy on Biofuels

ASEAN policy started with the ASEAN Plus Three Comprehensive Strategy on Food Security and Bioenergy in 2010 balancing the objectives of food and energy security, promoting biofuels from agricultural waste, and fostering research and development of biofuel technologies to establish best practice. This came with the Strategic Plan of Action for Food and Energy Security of 2010. The ASEAN Strategy on Sustainable Biomass Energy for Agricultural Communities and Rural Development in 2020-30 was introduced in 2021, aimed at fostering reliable, affordable and sustainable biomass energy, with the specific objectives of innovating biomass energy in rural areas, improving the standard of living for rural communities, and fostering shared research, education and policies, awareness, data sharing and technology transfer across ASEAN.

The plan includes the provision of finance for biomass production, and the development of a regional and national biomass market. As access to electricity is still low in several ASEAN countries the objective of using biomass energy to improve rural lives has been paramount. Several countries have sought to greatly expand the use of biomass energy, including Indonesia, Malaysia, Philippines, Vietnam and Thailand.

The Need for Biofuel Infrastructure

Infrastructure is needed for biofuels in order to collect, process, refine, and blend the biofuels. This requires processing plants, either as cooperatives for local farmers, or a larger scale supply chain for more plantation crops. Cooperatives have been tried in many countries such as Brazil, Kenya, and Thailand for the production of palm oil. Countries with more export-oriented policy objectives have invested in larger scale supply chains with processing and blending facilities for ethanol and biodiesel, such as Malaysia and Indonesia. Other countries, such as India, have invested in biodigesters at the local community level. Government subsidies have been made available to make biodigesters affordable for the many. One step up from the household level bio-digesters, are the cooperatives used for collecting the biofuels from individual small farmers and converting this into local electricity.

Conclusion: The Economic Case for Biofuels

One of the main issues is whether the economic case for biofuels is certain. At the local level biodigesters have been shown to be viable in some cases, but expensive in others. If larger-scale biofuels are sustainable we would expect to see commercial interest increasing. Examples internationally suggest that government support is currently a prerequisite, both at local level and at large scale level, perhaps while the economic case is still being proven and while countries are still in the process of developing the required infrastructure. One scenario is to see a commercially viable biofuels industry in the future. But the benefits of biofuels will also accrue in terms of additional incomes for farmers, export revenues, import substitution, benefits to climate, these benefits cannot be all obtained at the private investment level.

This leaves the case for government subsidy, and it becomes a policy decision to decide what the objectives of switching to biofuels should be, for the local level, or for export potential, or both. The biofuels sector will grow, both in Cambodia and more broadly in ASEAN, but it is worth being wary of the need for trade-offs. Land is the scarce commodity and biofuels take time to regenerate. As with current policy, it may be better to let the market emerge, and evaluate the benefits and the costs, and learn from the experiences of other countries. New

business models could result at the local level, and the more public private partnerships, and a strong emphasis on ESG evaluation to ensure that the benefits and costs derived are recognized and addressed.

For the full case study on Biofuels Industry in Cambodia: Building a Sustainable Business Environment for Replacing Biofuels, see the CamEd Website.

References

- Asian Development Bank. (2024). *Cambodia: Support for a Sustainable Power Sector (Public Project No. 52096-001)*. Asian Development Bank. Retrieved from https://www.adb.org/sites/default/files/project-documents/52096/52096-001-tacr-en_0.pdf
- Association of Southeast Asian Nations. (2021). *ASEAN strategy on sustainable biomass energy for agriculture communities and rural development (2020–2030)*. <https://asean.org/wp-content/uploads/2021/12/FAFD-53.-Biomass-Energy-Strategy-ASEAN-2020-2030-Final-Draft-210820.pdf>
- European Commission. (2023). *The European Sustainability Reporting Standards [ESRS]*. Delegated Regulation (EU) 2023/2772 (Currently under revision, the final version is expected in 2026. https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en)
- Food and Agriculture Organization of the United Nations. (2014). *BEFS bioenergy and food security approach implementation guide*. <https://www.fao.org/4/i3672e/i3672e.pdf>
- OECD (2018). *The OECD Due Diligence Guidance for Responsible Business Conduct*. www.oecd.org/en/publications/2018/02/oecd-due-diligence-guidance-for-responsible-business-conduct_c669bd57.html
- UN (2011). *Guiding Principles on Business and Human Rights*. www.ohchr.org/sites/default/files/Documents/Publications/GuidingPrinciplesBusinessHR_EN.pdf



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