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PRODUCT REFORMULATIONS: STANDARD VS. DYNAMIC COSTING IN THE AGE OF AI



Dynamic Costing in
Product Reformulations

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PRODUCT REFORMULATIONS: STANDARD VS. DYNAMIC COSTING IN THE AGE OF AI

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Dynamic Costing in Product Reformulations

Overview

In today's uncertain trade environment, the cost of raw material ingredients of a manufactured product can change dynamically due to tariffs, inflation, sanctions, embargoes, supply chain disruptions, and multiple other factors. Consequently, today's standard costing systems are ill-equipped to handle various costing and pricing issues that may arise.

How these issues are handled by a company's cost management system can significantly impact a company's financial health and competitive positioning. In manufacturing firms, especially in the *Fast Moving Consumer Goods (FMCG)* industry, there are further impediments to dynamic costing and pricing due to labelling laws and safety regulations.

This article particularly focuses on the reformulation of food products to meet specific price and profit objectives. The article seeks to determine the prevalence of this reformulation in the manufactured food industry, the obstacles it faces, and the potential benefits or drawbacks of *Artificial Intelligence (AI)* and *print-on-demand technologies* in these dynamic market conditions.

Reformulation of Ingredients in the Australian Food Manufacturing Industry

Regulation pertaining ingredient lists on labels

There is a set of regulations companies have to adhere to when selling packaged food in Australia.

Companies are required to label ingredients in descending order, from the highest weight to the lowest. Packaged food must also show the percentage of the “*key or characterising ingredient*”, according to *Food Standards Australia New Zealand* – the organisation that regulates food labelling (<https://www.foodstandards.gov.au/>).

For example, a cereal marketed as containing ‘oats’ must give the percentage of oats, and a ‘strawberry yoghurt’ must show the percentage of strawberries.

Reformulation is adjusting a recipe like one would do at home if one was on a budget. Reducing higher-value items, which contribute the highest cost, while maintaining flavour and nutrition elsewhere is the goal. Such reformulations, where significant, would require the relabelling of the product.

Significant variations in main ingredient in formulations

In a comprehensive study done by the *Australian Broadcasting Corporation (ABC)*, about 11,000 food products listed on the Australian retail giant *Woolworths'* website (<https://www.woolworths.com.au/>) were looked at to document the percentage changes for the main or “characterising” ingredient – like raspberries in raspberry jam – across a 15-month period.

The study used data collected by *Adam Williamson*, a data scientist, in the period between April 1, 2024 and July 1, 2025 (Glover, 2024). Note that although the other Australian retail giant *Coles'* ingredients information was not in the dataset due to Mr

Williamson’s difficulty collecting it, most of the products on the list are also available at Coles, IGA and other Australian food retailers.

The products studied included ice cream, meat, dips, jams, cereal and packaged meals, with some brands represented more than others. The results were staggering; there were significant reformulations happening across the board (Chwasta, Bonica, and Noonan, 2025).

The study found that corporate ‘Brands’ were generally more cautious about changing recipes compared with Private Label products (store brands). The reason is that, usually, Brands must stand behind the overall quality – if they have changed a product or someone buys it and they take it home and they realise it has changed, they may lose that customer.

Table 1: How the main or characterising ingredient in dozens of Retailer private label products has changed

Product	Ingredient	Older %	Newer %	Change %
Chris’ Dips Cheese & Chive 200G	Cream cheese	60%	26%	-56.7%
Bertolli With Butter With A Pinch Of Sea Salt 450g	Olive oil	20%	14%	-30.0%
Connoisseur Ice Cream Caramel Honey Macadamia 1L Tub	Cream	32%	23%	-28.1%
Connoisseur Ice Cream Classic Vanilla Tub 1L	Cream	36%	26%	-27.8%
Connoisseur Ice Cream Cafe Grande 1L Tub	Cream	29%	21%	-27.6%

ABC News / Source: Woolworths Online / Get the data

However, it is a different story with regard to retailer private labels. This is because there is a lot less risk for retailers if they disappoint customers with their own store brand—because the customer will return to the store anyway and buy a different product, for which the retailer still gets a sale.

To investigate this phenomenon more, the ABC investigators questioned Woolworths about several of its home-brand products where the main ingredient was reduced, some by as much as a staggering 56% (see Table 1)

A spokesperson for the retailer said the company was aware of cost-of-living pressures and that the recipes for some of its products had been changed to keep prices lower compared to similar items.

“We review our own brand product pricing, quality and composition from time to time for a number of reasons, including to meet customers’ preferences and ensure compliance with changes to food labelling regulations. In some cases, as a result of reviews, we make updates to product formulation, including to allow us to lower some ingredient costs and keep prices low and improve appearance and flavour.” (Chwasta et al., 2025).

Reasons for changes in formulation

The ABC investigators selected 47 products where the main ingredient appeared to decrease in proportion, according to the label, and contacted the manufacturers as to the reasons why. The study found that it was often not clear what exact ingredients had replaced the decreased proportion.

While some manufacturers said their changes were to improve the recipe, others said they were due to supply chain cost increases and wanting to keep the price of the product low. Similar changes, where the quality of the product decreases but the weight and price stay the same, have been labelled as “skimpflation” in overseas media. The phrase is a nod to “shrinkflation”, where the weight or size of a product gets smaller and the cost holds, meaning consumers pay the same for less product (Flemming, 2025).

Labelling Changes

The main reasons given for labelling changes were:

- Supply-chain difficulties:** The study was over the 15-month period from April 1, 2024 and therefore the impact of the Trump tariffs would have only been at the last few months. Since the easing of Covid-19-related supply chain shocks, there have been other supply chain disruptions, such as extreme weather events caused by climate change; protracted regional conflicts in Eastern Europe and the Middle East; escalating tensions in the South China Sea; and pirates choking sea supply lines in the Red Sea. This will result in labelling changes regarding country of origin. If a food manufacturer switches to a different source of an ingredient due to supply issues, the ingredient list on the label may need updating to reflect this change. Further, new suppliers’ materials might not comply with regulations such as a country’s labelling requirements, necessitating additional testing and certification.
- Improving recipes for taste and texture:** Abbott’s Bakery (George Weston Foods) told the ABC investigators that the reduction of wholegrain wholemeal wheat flour in its bread was made after “extensive research and testing” to improve the taste and texture, with more wheat flour and malt wheat flour introduced to the recipe. Cobs also said its cheese popcorn was given extra cheese flavour — at the expense of popcorn.
- Factory machinery changes:** As more and more manufacturers are converting to flexible manufacturing systems and robotics, higher levels of accuracy in formulations are possible. The Arnott’s Group said that factory machinery changes required changes in formulations in its 200g Kingston Cream Biscuits and its 500g Campbell’s Country Ladle Soup Garden Vegetable & Wholegrain Barley products. Such changes usually result in labelling changes.

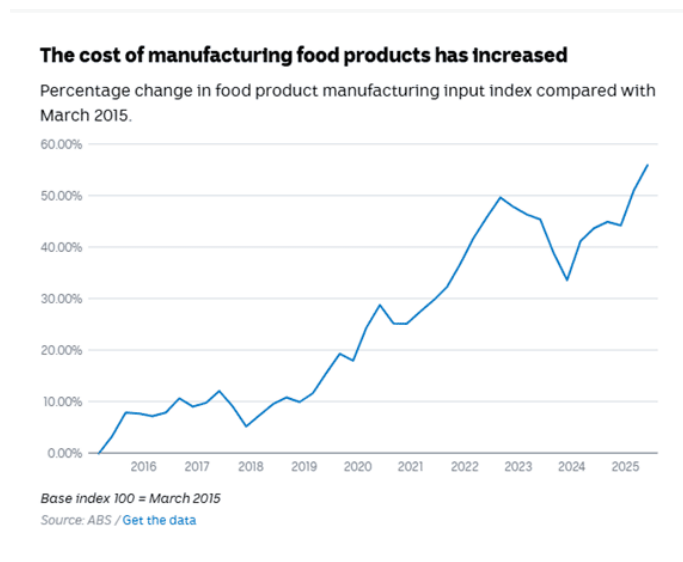
For products where the main ingredient actually increased, it was generally unclear as to what was replacing these ingredients. Australia’s laws state that most ingredients only need quantities, not percentages. Of the companies that responded to the ABC’s questions, only some provided detailed information about what had replaced the decreased ingredient.

Cost Considerations

Interestingly, **Cost considerations** were not specifically listed as a reason for changes in ingredient formulations.

However, most retail experts agree that **inflation** was likely a big contributor to these formulation decisions as input costs in most countries have gone up (Asher, 2024). The Food Manufacturing Input Index, a metric produced by the Australian Bureau of Statistics, reflects the rise in costs, as shown in Table 2.

Table 2: Percentage change in food product manufacturing input index compared with March 2015.



The metric looks at the change in cost of the ingredients that go into making food products, as well as electricity, gas, paper and cardboard, and shows how the price of these has risen — especially during COVID.

Traditional Manufacturing Challenges in Processed Food Manufacturing

In the area of reformulation of ingredients, there are currently many challenges to dynamic pricing and costing, such as:

Cost Fluctuations: Changes in the cost of raw materials directly affect the cost of goods sold (COGS). This variability can make it difficult to maintain stable profit margins. Fluctuating raw material costs can lead to budget overruns or require frequent revisions to financial forecasts. For example, if the price of a key ingredient like cocoa for a chocolate manufacturer rises due to supply shortages, the production cost per unit increases.

Price Adjustment Lag: There is often a delay in adjusting retail prices to reflect increased costs, which can temporarily squeeze profit margins.

Customer Sensitivity: Frequent price changes might alienate customers or lead to decreased demand if competitors do not follow suit. For example, a bakery might face customer pushback if it frequently adjusts prices for its bread products due to fluctuating flour costs.

Inventory Management Issues: One such issue in this area is *Stockpiling vs. Just-in-Time*. Companies may face decisions about whether to stockpile raw materials when prices are low, which can tie up capital, or rely on just-in-time inventory, which can be risky if prices rise unexpectedly. Another issue is *Obsolescence Risk*, i.e., holding excess inventory of raw materials that may become obsolete or lose value if demand shifts.

Supply Chain Disruptions: Companies heavily reliant on a few suppliers for key ingredients may face significant disruptions if those suppliers encounter problems. For example, a beverage company relying on a single supplier for a unique flavouring might face production halts if that supplier has a supply chain breakdown.

Companies may need to diversify their supplier base to mitigate risks associated with reliance on a single supplier. For example, a food processing company might source wheat from multiple suppliers in different regions to mitigate risks of regional crop

failures. This strategy can provide more flexibility and bargaining power. However, this can be a problem if the suppliers are subject to different tariffs or fall foul of sanctions.

Contractual and Legal Challenges: Companies with long-term supply contracts might benefit or suffer based on how raw material markets fluctuate. For example, a fixed-price contract might protect against rising costs but could be disadvantageous if prices fall.

How AI Could Further Disrupt Food Formulation, Costing and Pricing

Let us take the case of the simple product, a pack of 'tea bags'.

A large manufacturer, say like *Lipton APAC*, will ask its buying agents (say domiciled in Australia) for a particular grade of tea leaves for a specific blend. The buying agent asks a broker (say domiciled in Sri Lanka) to send samples of the tea leaves that are coming up for auction. The samples are couriered to the buying agent, who then tells the broker the quantity and maximum price at which to buy the tea leaves. The broker does this and ships the tea to the buying agent, who then ships it to Lipton (APAC). In addition to the cost of the tea leaves, there is bank interest, warehousing and shipping costs and tariffs involved. These can vary depending on the economic and trade conditions prevalent at the time.

Exporting tea also requires compliance with various certifications and regulations to ensure quality, safety, and sustainability. Lipton ultimately bears these costs and the middleman's fees. However, Lipton most likely will have a fixed-price contract with a retailer such as (say) *Woolworths* in Australia. As such, it will change formulations to achieve the best profit margin while still maintaining an acceptable taste and quality of its offerings. It will also need to ensure that its labels (which are pre-printed on its boxes) are accurate within the flexibility allowed by law.

Much of the above process can be significantly speeded up by *AI agents*, especially in the area of reformulation by blending different grades of tea leaves.

Impact of AI on Financial Planning and Forecasting

Dynamic Pricing

Companies had always needed to continuously analyse and adjust their pricing and cost structures to maintain desired profit margins. However, with AI, this can be done on a real-time basis. Already we are seeing dynamic pricing in the transportation (Uber) Airline (Delta) and Hotel (Booking.com) industries.

Dynamic pricing in food manufacturing involves adjusting prices based on various factors such as demand, production costs, market conditions, and competition. This strategy allows manufacturers to optimise revenue and manage inventory more effectively. Here are some examples of how dynamic pricing is utilised in the food manufacturing industry.

A fruit juice manufacturer may increase prices during off-season periods when raw materials like certain fruits are less available and more expensive. Conversely, during peak harvest times, when fruit supply is abundant, prices may be lowered to encourage sales and manage inventory. AI will provide this demand and supply information on a real-time basis.

A cereal manufacturer might use dynamic pricing to match or beat competitors' promotions. If a competitor offers a discount on a similar product, the manufacturer may temporarily lower their prices to remain competitive in the market. AI agents will alert the manufacturer of the competitors' promotions and their impact on the company's sales on a real-time basis.

A manufacturer of canned soups might offer dynamic pricing to wholesalers or retailers, providing discounts for larger orders to encourage bulk purchasing and reduce warehousing costs.

The biggest impact of AI is on *real-time online pricing*. For example, an online food retailer might use algorithms to adjust prices in real-time based on website traffic, competitor pricing, and stock levels. For example, if a particular product is trending or receives high traffic, the price might be temporarily increased to capitalise on demand.

Dynamic Pricing will lead to *Cost-Driven Pricing Decisions*. For example, if a dairy manufacturer experiences an increase in milk prices due to supply chain disruptions, they might adjust the prices of their cheese and yogurt products accordingly to maintain profit margins.

This requires a cost management system that can keep pace with the real-time demands of Dynamic Pricing.

Dynamic Cost Accounting

AI coupled with real-time granular costing has the potential to dynamically attach changes in input costs that will lead to a more sophisticated cost accounting system in which costs are accurately attached or allocated in order to maintain financial transparency. *This will be the greatest impact of AI.*

'Standard Costing' (with its variances at the end of a reporting period) will be replaced with 'Dynamic costing' where every change in formulations will generate a new standard. This will lead to a very sophisticated system of 'Actual Costing', where materials, labour and overhead will be at actual costs.

Traditionally, with standard costing, a manufacturing firm needed to update its standard costing methods frequently to ensure accurate financial reporting. With 'Dynamic Costing', this will be done on a real-time basis as product formulations change.

Dynamic Product Reformulation

With the advent of AI agents, changes in raw material availability or costs that may necessitate *reformulating products* to maintain cost-effectiveness or meet regulatory standards can be instantly analysed by obtaining information from multiple sources. For example, a beverage company might need to reformulate its drink recipes if a key ingredient becomes too expensive, ensuring the product remains profitable while maintaining quality. With traditional manufacturing methods, the company's chemists and food technologists will take weeks to collect this information and then further time to test out new formulations.

AI will open new opportunities in volatile raw material markets. The use of AI agents might encourage companies to explore alternative materials or *innovate* with new products that use less costly or more sustainable ingredients. For example, a company might develop a new line of *eco-friendly packaging* in response to rising costs of traditional materials.

AI-Driven Product Re-Formulation: The Relabelling Challenge

When food ingredients are changed dynamically, several challenges related to labelling and food standards can arise. These challenges are crucial as they impact compliance with regulatory requirements, consumer trust, and brand reputation. Relabelling is definitely the biggest challenge facing food manufacturers. Whilst AI agents can dynamically speed up the reformulation process to meet seasonal, environmental, supply chain and pricing constraints, it cannot at present change printed labels on processed food products dynamically.

Frequent ingredient changes necessitate *redesigning and reprinting labels*, which can be costly and logistically challenging, especially for large product lines. This is the most significant challenge of *dynamic product reformulation* using AI Agents. In the case of digital products such as hotel reservations, airline tickets or uber rides, there are no labels that have to be changed.

But with processed food products sold via supermarkets, dynamic product reformulations must be reflected in product labels. The costs can be exorbitant. A beverage company may incur significant costs if it has to continually update the labels of its various drink flavours due to changing sweeteners.

It must be remembered that incorrect labelling due to ingredient changes can lead to *legal action* if consumers suffer adverse effects, such as allergic reactions. A mislabelled product that fails to disclose the presence of an allergen can result in lawsuits and damage to the brand's reputation.

Managing existing inventory with old labels can be challenging. Companies must decide whether to use up existing label stock or discard it, which can lead to waste. A manufacturer might face a dilemma on whether to sell off existing stock with outdated labels or replace them, balancing cost against compliance and consumer trust.

Companies exporting products need to ensure that their labels meet the regulatory standards of each country they operate in, which can vary significantly. A food company exporting to both the EU and the US will need to adjust its labelling to meet the differing allergen and nutritional labelling requirements of each market. Ingredient changes might also need to consider cultural preferences or restrictions, such as halal or kosher certifications for those exporting to Muslim or Jewish countries.

Similarly, introducing an animal-derived ingredient in a product previously marketed as vegan or vegetarian can require certification changes and can affect marketability in certain regions.

Given such labelling constraints, it can be envisaged that in the not-too-distant future, the modern advances that we have seen in *print-on-demand technologies* could be expanded to FMCG product labels, where the label is considered just another raw material ingredient that can be printed on demand at the time of finishing and packaging each product individually. Another possibility is that legislation may be changed so that all FMCG products require having **QR codes** that can reveal their ingredient compositions on customers' phones, rather than on printed labels.

Conclusion

In an environment where food ingredients change dynamically due to cost fluctuations, supply chain disruptions, or market demands, businesses face a multitude of challenges related to labelling and food standards. These challenges encompass regulatory compliance, allergen management, and maintaining the validity of health claims, all of which are crucial for ensuring consumer safety and trust.

Companies must also navigate the complexities of marketing and branding, as ingredient changes can affect product positioning and brand perception. The logistical and financial implications of updating labels and managing inventory further add to the complexity, requiring strategic planning and resource allocation.

Furthermore, in the global market, ensuring compliance with diverse international standards and cultural sensitivities is vital for maintaining market access and competitiveness. Lastly, businesses must remain committed to consumer experience through rigorous product testing, ensuring that quality and sensory expectations are consistently met.

Overall, while dynamic ingredient changes pose significant challenges, they also present opportunities for innovation and improved supply chain resilience. By proactively managing these changes through transparent communication, strategic sourcing, and adaptive marketing strategies, companies can maintain brand integrity and consumer trust while navigating the complexities of modern food production and distribution

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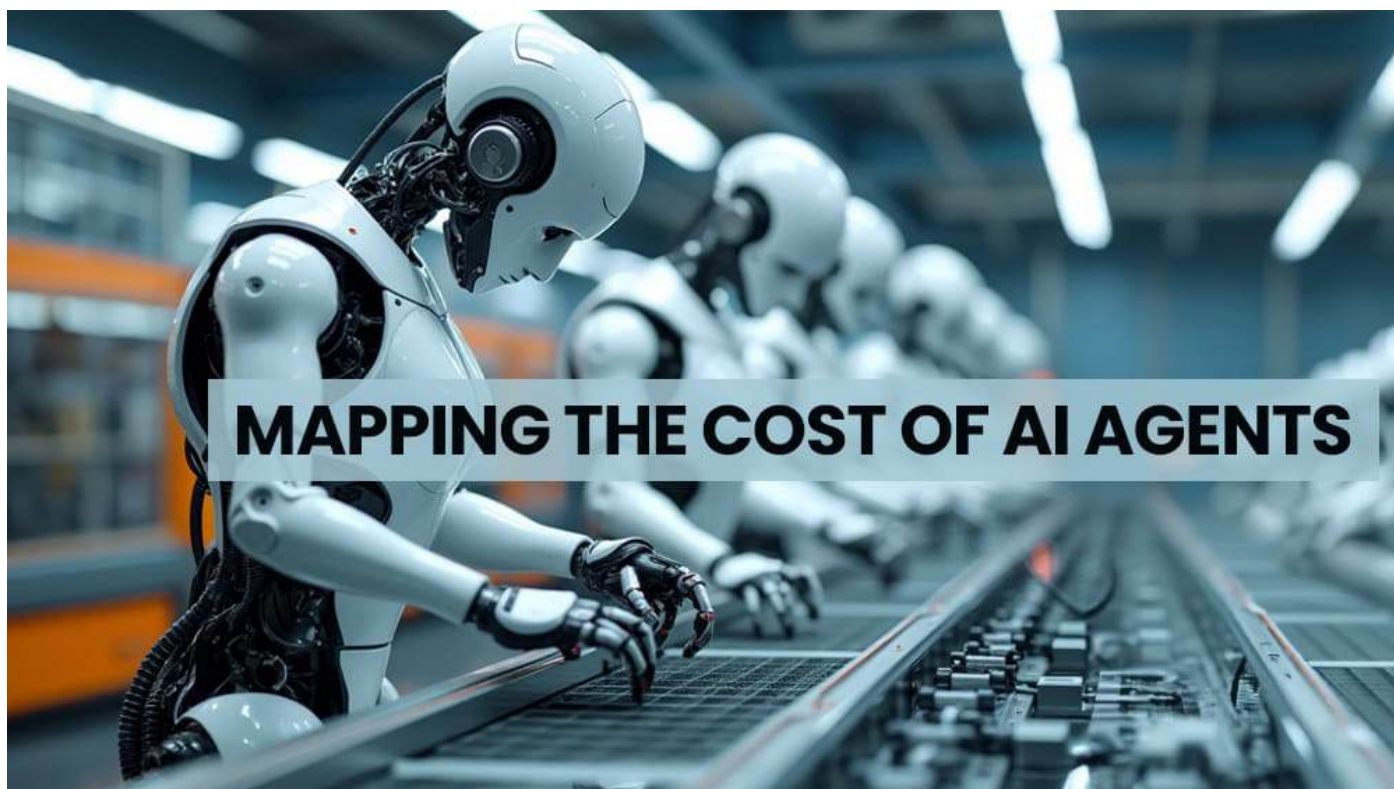
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AUTONOMOUS AI AGENTS: UNLEASHING NEW COSTS AND TRANSFORMING WORK AND SOCIETY

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MAPPING THE COST OF AI AGENTS

Over the past three years, the field of artificial intelligence (AI) has undergone remarkable advancements that have captivated our imaginations with unprecedented capabilities in language processing and creative problem-solving. These developments, impressive as they are, merely represent the opening act of a broader technological revolution. We are now entering a new era characterized by the emergence of autonomous AI agents capable of taking action independently and augmenting human work. This shift to an 'Agentic Era' signifies a revolutionary transformation that will fundamentally redefine how humans work, live, and connect with one another.

For management accountants, this shift represents key challenges for cost management systems. The cost of labour (human input) has been a core driver of both product costing and the cost of services. Over the past 50-years, direct labour has been superseded with indirect (shared) labour as organisations automated and human programmers and other human white-collar workers took over from the 'blue-collar' workers.

As organisations evolved and became more complex, new cost allocation systems such as *Activity Based Costing (ABC)* with multiple cost-drivers replaced the more traditional cost allocation systems based on a single volume-driver, such as '*direct labour hours*'.

This article considers the impact on cost management systems as machines and robots that currently require human engineers and programmers are replaced by autonomous AI agents. Will there be a return to a world in which most of the costs are 'direct', albeit in

a non-human 'digital labour' form? Will there be no need to have allocations at all, if the cost of these agents can be captured at the granular transactional level? Are there any hidden costs associated with the wide-scale adoption of AI Agents across many industries?

The Evolution from Predictive and Generative AI to Autonomous Agents

Today, we are accustomed to '*predictive AI*', which analyses data to provide recommendations, forecasts, and insights, and '*generative AI*', which learns from data patterns to seamlessly generate text, images, music, and code. '*AI agents*', however, represent a significant leap forward from these AI systems. Unlike traditional AI systems, AI agents are capable of performing tasks autonomously, making decisions, negotiating with other agents on behalf of humans, and adapting to new situations without requiring constant human input. This technological leap is not merely an evolution but a revolution, as it offers intelligent, scalable digital labour capable of performing tasks independently.

Consider a large retailer during the holiday season. Traditionally, human workers or pre-programmed software might handle customer inquiries or inventory updates. However, intelligent digital agents can now manage these tasks in real-time, responding to customer questions, monitoring stock levels, reordering inventory, and coordinating with shipping providers—all without human intervention. This newfound capability enables a scale of operations previously unattainable, allowing businesses to scale their operations while driving down costs and improving responsiveness.

In healthcare, AI agents are already beginning to transform the way care is delivered. With many doctors and nurses facing burnout and shortages impacting provider availability, agents can alleviate administrative burdens and improve patient communication, allowing healthcare professionals to focus on complex cases that require their expertise. For example, agents can reach out to patients post-procedure to check on their recovery, remind them about follow-up appointments, and monitor their progress, all while maintaining an understanding of their medical history and treatment plans.

The shift to '*intelligent digital labour*' is already unlocking capacity across various industries by removing the constraints of human availability, physical limits, and geographical boundaries. Businesses can now operate on a global scale, opening up new opportunities previously limited by location. This transformation holds the potential to reshape industries and create new avenues for growth across the board.

Simultaneously, the significant cost of hiring and managing humans, from salaries, leave records, overtime and bonuses to issues of workplace safety, discrimination, burnout, sexual harassment, etc., will be avoided. The cost of running the '*Human Resources Function*' in organisations will be significantly reduced if not avoided completely.

Netflix- A Case Study of Budget Implications of using AI Agents.

Netflix's recent use of generative AI to create a building collapse scene in the sci-fi show *El Eternauta* (*The Eternaut*) is not only a technological milestone but also has significant budgetary implications. The shift from traditional CGI (computer-generated imagery) to generative AI is the most significant change in visual effects (VFX) since computer graphics displaced physical effects.

Traditional physical VFX requires legions of artists meticulously crafting mesh-based models, spending weeks perfecting each element's geometry, lighting and animation. Even the use of CGI with green screens demands human artists to construct every digital element from 3D models and programme the simulations. They have to manually key-frame each moment, setting points to show how things move or change. Netflix's generative AI approach marks a fundamental shift. Instead of building digital scenes piece by piece, artists simply describe what they want and algorithms generate full sequences instantly. This turns a slow, labourious craft into something more like a creative conversation.

El Eternauta's building collapse scene demonstrates this transformation starkly. What would once have demanded months of modelling, rigging and simulation work has been accomplished through text-to-video generation in a fraction of the time.

The economics driving this transformation extend far beyond Netflix's creative ambitions. The text-to-video AI market is projected to be worth £1.33 billion by 2029. This reflects an industry looking to cut corners after the streaming budget cuts of 2022. In that year, Netflix's content spending declined 4.6%, while Disney and other major studios implemented widespread cost-cutting measures.

AI's cost disruption is bewildering. Traditional VFX sequences can cost thousands per minute. As a result, the average CGI and VFX budget for US films reached US\$33.7 million (£25 million) per movie in 2018. Generative AI could lead to cost reductions of 10% across the media industry, and as much as 30% in TV and film. This will enable previously impossible creative visions to be realised by independent filmmakers – but this increased accessibility comes with significant job losses (White, 2025).

The OECD reports that 27% of jobs worldwide are at "high risk of automation" due to AI. Meanwhile, surveys by the International

Alliance of Theatrical Stage Employees have revealed that 70% of VFX workers do unpaid overtime, and only 12% have health insurance. Clearly, the industry is already under pressure (OECD, 2024).

The Impact of AI Agents on the Cost of Human Input

AI agents have the potential to significantly transform manufacturing organisations by replacing or augmenting direct labour costs, and hence impacting cost management systems. Areas in which human costs will be most significantly impacted are (a) automation of routine tasks, (b) demand forecasting (c) enhanced production planning, (d) quality control and assurance, (e) safety and risk management and (f) data-driven decision making.

In the area of **Automation of Routine Tasks**, AI-powered robots and automated machinery can perform repetitive tasks such as assembly, welding, painting, and quality inspection. By automating these tasks, companies can reduce the need for manual labour, leading to decreased labour costs. AI Agents can also be deployed in *predictive maintenance* by training them to predict equipment failures before they occur and optimising maintenance schedules. This impacts labour costs by minimising downtime and the need for emergency repairs, and reduces the labour required for maintenance.

In the area of **Demand Forecasting**, AI systems are being used to predict market demands, allowing companies to adjust production levels accordingly. By aligning production with demand, minimising the need for extra shifts or temporary labour to meet unexpected demand spikes. For example, AI forecasts seasonal demand increases, ensuring that production is scaled appropriately without relying on costly temporary labour.

In the area of **Enhanced Production Planning**, AI agents can be used for *supply chain optimisation* by analysing data to optimise inventory levels and supply chain logistics. This impacts labour costs by reducing manual intervention needed for inventory management and logistics planning. For example, AI agents can forecast demand and adjust inventory levels in real-time, reducing the need for workers to manually track and order supplies. AI agents can also be used in scheduling and resource allocation by optimising workforce scheduling based on production demands and employee availability. This ensures the efficient use of labour, minimising overtime and prevents the underutilisation of staff.

In the area of **Quality Control and Assurance**, AI-powered vision systems can carry out *automated quality inspections* that can inspect products for defects faster and more accurately than human inspectors. This reduces the need for human inspectors, lowering labour costs associated with quality control. Already, AI systems in electronics manufacturing are being used to detect defects in circuit boards with high precision, improving quality while reducing inspection labour. *Process optimisation*, where AI agents analyse production processes to identify inefficiencies and suggest improvements are already being implemented across many companies. Such streamlined operations reduce the need for manual oversight and intervention, thereby cutting labour costs. For example, AI-driven analytics identify bottlenecks in a production line, allowing for adjustments that improve efficiency and reduce the need for additional staffing.

In the area of **Safety and Risk Management**, AI-driven robots are increasingly being used in *hazardous task automation* by deploying them to perform dangerous tasks, thus reducing the risk of injury to human workers. This lowers costs associated with workplace injuries, insurance, and compensation. AI systems are also being used in *risk assessment*, to assess operational risks and provide mitigation strategies. This reduces the need for extensive human involvement in risk assessment and safety planning, a significant cost saving. For example, AI agents are being used to

predict potential safety hazards in a production line, allowing for preemptive action to prevent accidents and reduce associated costs.

It is in the area of **Data-Driven Decision Making**, however, that AI agents have the greatest potential impact on the *cost of human input* in organisations. Already they are being deployed in *real-time analytics*, in which AI systems provide real-time data insights that help managers make informed decisions quickly. Many companies have developed *AI enhanced dashboards* to display production metrics and trends, enabling managers to adjust operations on the fly without extensive manual data analysis. This reduces the need for data analysts and manual data processing, shifting labour demands from data collection to strategic oversight. However, in the very near future, AI agents will have the capability to make many informed strategic decisions themselves. This will significantly impact the cost of senior management as well.

Unlocking Capacity Across Industries

As with any monumental change, the rise of AI agents comes with its own set of challenges and concerns. Ensuring that AI systems are built with trust, accountability, fairness, and transparency as core values is paramount. As AI transforms the workplace, it is crucial to invest in the training, creativity, and critical thinking skills that are uniquely human.

In this article, it is assumed that future AI Agents will be trained to implement ethical AI practices. This training will begin at the development phase, where AI systems are trained on diverse and representative datasets to avoid biases that could lead to discriminatory outcomes. Let us also assume that there will be transparency in AI algorithms and decision-making processes so that trust has been built among users and stakeholders, ensuring that AI agents in the future will operate within ethical boundaries and contribute positively to society.

The question is, *“Who pays for all this training of AI Agents – giving them the creativity, and critical thinking skills that are uniquely human?”*

The cost of such advanced training will be borne by the users, via the pricing mechanism. The suppliers of the AI Agents, will incorporate development and training costs into their prices. If the fee is charged on a *pay-per-usage* or *subscription* basis, then the accounting will be similar to a software licence and be expensed. In such cases a ‘human input cost’ will now show as an ‘overhead cost’. However, it may be better to show such costs as a ‘*Digital Labour Costs*’ in the profit & loss account.

If the AI Agents are linked to robotics, they will be performing physical tasks previously done by humans. In such cases they should be treated as no different to plant and machinery and capitalised. Thus a human cost item that directly impacted the ‘profit & loss’ account in previous periods, will now impact it only indirectly via depreciation.

Navigating the Disruptions and Risks

While the benefits of AI agents are clear, the transition to this new “Agentic Era” will inevitably bring disruptions and risks. Some companies may struggle to adapt, and nearly every job will undergo some level of change. As history has shown with previous technological advancements—such as the advent of jets, the Internet, and smartphones—some jobs may disappear, but new opportunities will emerge. For instance, in 1950, there were 43 million employed Americans, and by 2020, that number had grown to over 152 million, with many new jobs in categories that did not exist before (Benioff, 2024).

The difference between ‘then’ and ‘now’ is, however, that all those earlier ‘new jobs’ required humans to fill them. The ‘new jobs’ that will be created in the coming *Agentic Era* would most likely be filled by the *AI Agents* themselves.

Although the rise of AI has already led to the funding of over 5,000 new artificial intelligence companies in the U.S. alone over the past decade, once the technology settles, there will surely be a shake-down of the industry. After all, in the first decade after the “birth” of the US automobile industry, there were 485 American automobile manufacturers (Rae and Binder, 2025). Today, in the USA there is only the Big-3 —GM, Ford and Stellantis(Chrysler) — and Tesla.

Automobile technology not only impacted that industry but also had a ripple effect across the global economy, creating jobs and driving technological advancements in various sectors. This not only impacted the automobile industry but also had a ripple effect across the global economy, creating jobs and driving technological advancements in various sectors. Similarly, AI’s growth will not only impact the tech industry but also have a ripple effect across the global economy. Clearly, AI agents are poised to drive significant innovation, creating countless new companies and job opportunities. The question is, “Would the new jobs created be filled by humans or AI Agents?”

One can envisage AI’s potential to contribute to GDP growth in regions where the skilled or semi-skilled labour force is stagnant or shrinking. However, in the coming *Agentic Era*, even professional jobs will be able to be done by *AI Agents*.

Ethical Considerations and Governance

While AI agents hold great promise, it’s crucial to acknowledge the ethical considerations and governance challenges they present. Technology, in itself, is neutral; it is how we choose to use it that determines its impact. Without adequate oversight and well-curated training data, autonomous AI systems can make decisions that conflict with human values or ethics. For example, they might prioritise profit over safety or inadvertently discriminate against certain groups. To harness the power of agentic AI effectively, a multistakeholder approach involving businesses, governments, nonprofits, and academia is necessary to establish clear guidelines and guardrails.

Efforts are already underway to address these challenges. The G7 nations have put forward a framework that emphasises accountability, transparency, safety, and data privacy. Similarly, the Bletchley Declaration, supported by 28 countries and the European Union, emerged from the UK AI Safety Summit. This declaration represents a collective commitment to collaborate on AI safety and development, ensuring that AI advancements are aligned with societal values and ethical standards.

Building a Framework for Responsible AI Agent Deployment

To fully realise the potential of AI agents, it’s essential to build a robust framework for their responsible deployment. This involves establishing clear ethical guidelines, promoting transparency in AI systems, and ensuring that AI systems are developed and used in ways that align with societal values. A collaborative approach involving multiple stakeholders—businesses, governments, academic institutions, and civil society—is crucial in crafting regulations and policies that govern AI technologies effectively.

Further, as AI agents increasingly interact with both corporate and personal data, ensuring data privacy and security becomes paramount. In the case of human workers, organisations employ a variety of strategies to protect confidential information and prevent employees from divulging it. These protections can be categorised into legal, procedural and technical measures.

Legal protections such as *employment contracts* that include clauses that address the handling of confidential information; *non-disclosure agreements (NDAs)* and *intellectual property (IP)* agreements obviously make no sense with an AI Agent, and thus will need to be modified and contracted with the supplier of the AI Agent.

Procedural protections such as *information access controls* can be implemented with AI Agents to limit access to confidential information based on role and necessity. However other procedural protections such as *exit interviews* to reinforce confidentiality obligations at the termination of employment, again are not applicable to AI Agents.

What the organisation will need to do is to beef up *technical protections* such as *data encryption* and *network security* measures to secure company networks from unauthorised access. Firewalls, intrusion detection systems, and secure VPNs will be required at the AI Agent level.

Therefore, robust data protection measures must be implemented to safeguard sensitive information from unauthorised access and misuse. This includes developing advanced encryption techniques, establishing clear data governance policies, and fostering a culture of privacy awareness among AI developers and users.

Data privacy concerns can be addressed through regulations such as the General Data Protection Regulation (GDPR) in Europe, which provides a framework for protecting individuals' data rights. By adopting similar standards globally, we can ensure that AI technologies respect user privacy and maintain public trust in digital systems.

Conclusion: Embracing the Agentic Era

The advent of autonomous AI agents marks a transformative milestone in the evolution of technology, offering unprecedented opportunities to redefine how we work, live, and interact with the world around us. By harnessing the power of these intelligent systems, we can unlock new levels of efficiency, innovation, and inclusivity across industries and communities worldwide.

However, realising the full potential of the Agentic Era requires a concerted effort from all sectors of society. It demands a commitment to ethical practices, transparency, and collaboration to ensure that AI technologies are developed and deployed in ways that align with our shared values and address societal challenges.

As businesses, governments, and individuals come together to navigate this new landscape, the focus must remain on fostering an environment that encourages innovation while safeguarding the rights and well-being of all stakeholders. By investing in education, promoting data privacy, and building robust ethical frameworks, we can create a future where AI agents not only enhance productivity and economic growth but also contribute to a more equitable and sustainable world.

In this new era, AI agents have the potential to not only drive technological advancement but also to empower individuals, uplift communities, and address global challenges such as climate change and healthcare access. As we move forward, let trust, responsibility, and collaboration be our guiding principles, ensuring that the transformative power of AI is harnessed to create a future of abundance and opportunity for all.

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YOUR PASSWORD WON'T SAVE YOU: QUANTUM COMPUTING AND THE COMING FINANCIAL SECURITY CRISIS

Kapila Dodamgoda



We live in an intricately connected digital world. From the moment we wake up, we interact with systems and platforms that define our personal and professional lives—banking apps, messaging platforms, cloud storage, social media, trading platforms, enterprise systems, ERPs, CRMs, accounting software, and payment gateways. Every one of these requires a login, typically secured with a username and password.

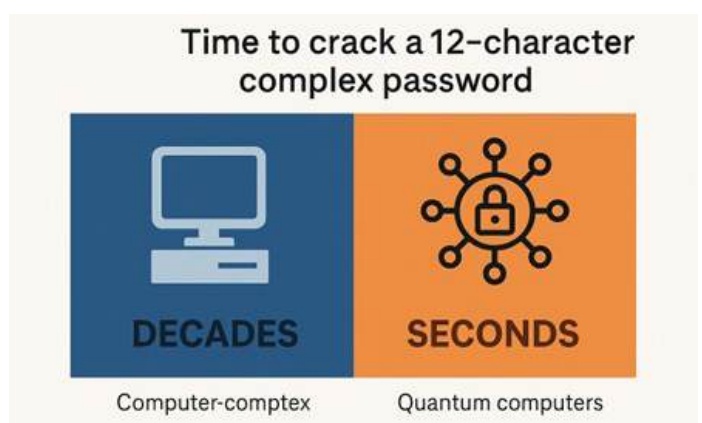
We trust these credentials to protect our most valuable assets: our identity, finances, transactions, client data, and company secrets. But the digital world is on the brink of disruption, and the most powerful threat isn't a hacker with a laptop—it's quantum computing.

How Traditional Passwords Work—And Why They've Been “Good Enough”

Most conventional systems use passwords in combination with hashing algorithms and encryption. Strong passwords—those with a mix of uppercase, lowercase, numbers, and symbols—are difficult to crack by brute-force due to the computational limits of current machines.

For example, a 12-character complex password might take decades to break using brute-force attacks with today's computing power. Encryption standards like RSA (Rivest–Shamir–Adleman) or AES (Advanced Encryption Standard) rely on the assumption that factoring large numbers or solving specific math problems is time-consuming and resource-intensive for classical computers.

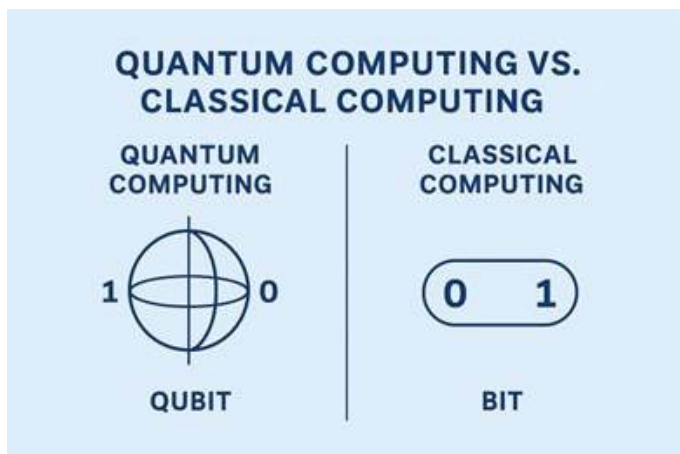
But what if a machine could do in seconds what would take today's fastest supercomputers centuries?



What Is Quantum Computing?

Quantum computing isn't just a faster version of today's computers—it's an entirely new paradigm. Instead of using bits (0s and 1s), quantum computers use qubits, which can represent 0, 1, or both simultaneously due to a property called superposition. These qubits can also link together in a phenomenon called entanglement, allowing for powerful parallel processing.

The result? An exponential leap in computational power—capable of solving problems that even the best supercomputers can't touch.



Are Quantum Computers Real?

Yes—quantum computers are real and functioning. Companies like Google and IBM have already built experimental machines—Google’s “Willow” chip and IBM’s “Osprey”—that have performed calculations beyond the reach of any classical supercomputer.

These machines have demonstrated quantum advantage, proving they can outperform traditional systems on specific tasks. Backed by billions in global investment, their success validates the physical reality of quantum computing and confirms decades of quantum theory.

The Alarming Risk: Quantum and Cybersecurity

Here’s where it gets terrifying: once quantum computers reach sufficient maturity, they’ll be able to break the encryption that underpins financial systems, national security, medical records, and more.

Many of today’s digital systems—especially in banking, online payments, cloud transactions, and secure messaging—are protected by cryptographic algorithms such as:

- **RSA:** Used widely for secure data transmission
- **DSA (Digital Signature Algorithm):** Secures digital signatures
- **ECC (Elliptic Curve Cryptography):** Popular for mobile, blockchain, and IoT security

These algorithms rely on the mathematical difficulty of certain problems (like factoring large numbers) to keep data safe.

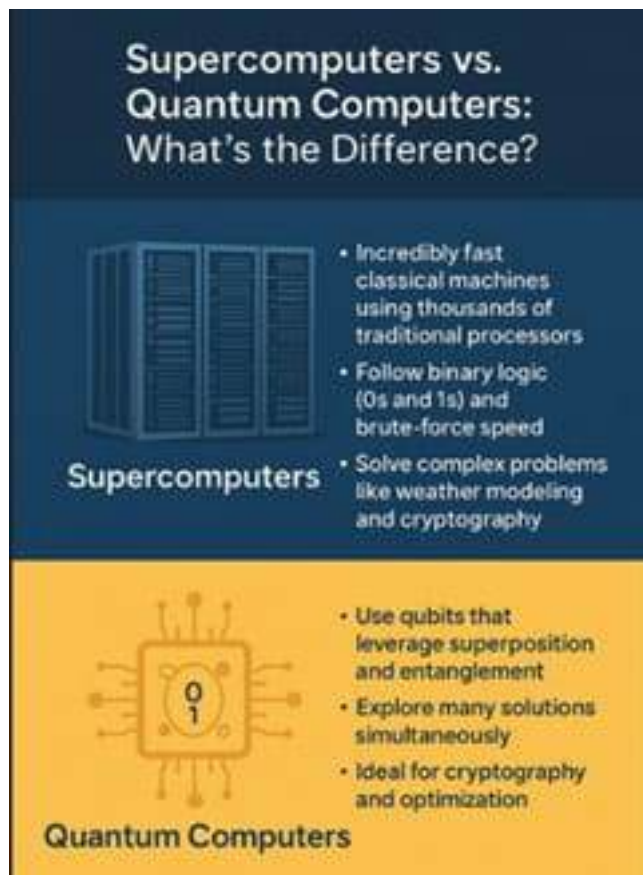
But **Shor’s Algorithm**, a powerful quantum method, can factor large numbers exponentially faster than traditional methods. This means that a sufficiently powerful quantum computer could potentially break RSA, DSA, or ECC encryption in minutes, rendering them useless—and exposing sensitive financial data.

Encryption Type	Algorithm	Quantum Safe?	Usage
RSA-2048	RSA	? No	Web, email, banking
ECC (secp256k1)	ECC	? No	Bitcoin, Blockchain
AES-256	Symmetric Cipher	? Partially	General encryption
Kyber	PQC (NIST finalist)	? Yes	Future communications
Dilithium, Falcon	PQC Signatures	? Yes	Digital identity

Supercomputers vs. Quantum Computers: Why is the Case Different?

Supercomputers are incredibly fast classical machines used for complex calculations—weather modeling, molecular simulations, cryptography, and more—by harnessing thousands of traditional processors in parallel. They follow binary logic (0s and 1s) and rely on brute-force speed to solve problems. Quantum computers, on the other hand, use qubits—quantum bits that can represent multiple states simultaneously thanks to superposition and entanglement.

This enables them to explore many solutions at once, making them ideal for solving problems that even the fastest supercomputers would take centuries to crack. In short: supercomputers are powerful; quantum computers are exponentially powerful for specific tasks, especially in cryptography and optimisation.



Will Quantum Computing Improve Bitcoin Mining?

Yes, quantum computers could theoretically speed up Bitcoin mining using Grover’s algorithm, which offers a faster way to solve the brute-force computations behind Proof-of-Work. However, this remains hypothetical—today’s quantum machines aren’t yet powerful or cost-effective enough. Even if they were, the Bitcoin network would self-adjust its mining difficulty, rebalancing the advantage. The greater concern lies elsewhere: quantum computing’s potential to break Bitcoin’s encryption, threatening the very foundation of its security.

Is Quantum Computing a Threat to Bitcoin and Crypto?

Yes—but not immediately.

A powerful quantum computer could, in theory, crack the encryption that protects Bitcoin wallets, allowing attackers to derive private keys from exposed public keys and steal funds. The greatest risk lies in older or reused addresses where public keys have already been revealed.

While the risk isn’t immediate, the crypto community is already preparing. Quantum-resistant blockchain algorithms are being developed. Still, the broader implication remains: the entire internet’s encryption infrastructure, including HTTPS, VPNs, and secure logins, could be affected.

Is the Quantum Threat Immediate?

Not quite—but **we are in the warning phase.**

Today’s quantum computers remain experimental and aren’t

yet capable of breaking real-world encryption. But research is advancing rapidly. Experts suggest that within 10–15 years, quantum computers may reach the scale required to challenge today's encryption.

The danger is also retrospective: attackers can “harvest now, decrypt later”—stealing encrypted data today and decrypting it once quantum capabilities catch up. This puts archived financial data, old emails, contracts, and backups at long-term risk.

Precautions: What You Can—and Must—Do Now

1. Transition to Quantum-Resistant Encryption

International standards bodies like NIST are already finalising post-quantum cryptography (PQC) algorithms. Financial institutions must begin migration now, especially for long-term archives and core systems.

2. Audit Your Cyber Exposure

Work with IT to assess which systems use traditional encryption. Focus on systems handling:

- Personally Identifiable Information (PII)
- Financial statements and audits
- Client portfolios and sensitive transaction data

3. Educate Teams and Clients

Cyber risk isn't just for IT teams. Finance, legal, audit, and operations staff must understand quantum risk—and embed it into risk assessments and vendor evaluations.

4. Secure Archived Data

Even if your data seems safe today, it could be decrypted tomorrow. Re-encrypt old backups and long-term data using quantum-resistant methods.

A Call to Finance Professionals

The age of quantum disruption is no longer distant—it's already unfolding. For finance professionals, this is more than a technology issue. It's a strategic, operational, and fiduciary challenge that calls for immediate attention and long-term planning.

Traditionally, the role of CFOs, controllers, auditors, and risk managers has been to manage capital, ensure compliance, and protect value. But in the quantum era, your role expands to include a new kind of asset: digital trust. If encryption collapses, so does the integrity of everything finance touches—transaction records, audit trails, payment systems, and investor confidence.

This is a call to move from **passive awareness** to **proactive defence**. Finance leaders must work with IT, cybersecurity, and compliance teams to:

- Map **digital exposure**, especially in areas handling sensitive or regulated data
- Upgrade **legacy systems** to prepare for **post-quantum encryption**
- Allocate budgets for **quantum-risk mitigation technologies**
- Lead **board-level discussions** on long-term cyber risk

Don't assume this is “IT's problem”. When a breach happens, it's finance that faces the scrutiny—from regulators, shareholders, and the public.

The era of quantum computing won't wait. It's **knocking on our firewalled doors**, testing our systems, and quietly harvesting our encrypted archives.

Finance must lead—not follow—in preparing for a future where security is measured not just in passwords, but in foresight.

Mr. Kapila Dodamgoda, BEng, FCMA, is the ICMA(ANZ) Regional Director for Sri Lanka



UNIVERSITIES CAN TURN AI FROM A THREAT TO AN OPPORTUNITY BY TEACHING CRITICAL THINKING

Anitia Lubbe



Across universities worldwide, a quiet revolution is underway. Generative artificial intelligence (AI) tools such as ChatGPT, Copilot, DeepSeek and Gemini are being used to produce essays, summarise readings, and even conduct complex assignments.

Generative artificial intelligence is a kind of AI that can handle a variety of creative tasks in diverse domains, such as arts, music and education.

For many university teachers, this raises alarm bells about plagiarism and integrity. While some institutions have rushed to restrict or support AI use, others are still unsure how to respond.

But focusing only on policing misses a bigger issue: whether students are really learning. As an education researcher, I'm interested in the topic of how students learn. My colleagues and I recently explored the role AI could play in learning – if universities tried a new way of assessing students.

We found that many traditional forms of assessment in universities remain focused on memorisation and rote learning. These are exactly the tasks that AI performs best.

We argue that it's time to reconsider what students should be learning. This should include the ability to evaluate and analyse AI-created text. That's a skill which is essential for critical thinking.

If that ability is what universities teach and look for in a student, AI will be an opportunity and not a threat.

We've suggested some ways that universities can use AI to teach and assess what students really need to know.

Reviewing studies of AI

Universities are under pressure to prepare graduates who are more than just knowledgeable. They need to be self-directed, lifelong learners who are independent, critical thinkers and can solve complex problems. Employers and societies demand graduates who can evaluate information and make sound judgements in a rapidly changing world.

Yet assessment (testing what students know and can do) tends to focus on more basic thinking skills.

Our research took the form of a conceptual literature review, analysing peer-reviewed studies published since the release of the AI tool ChatGPT in late 2022. We examined how generative AI is already being used in higher education, its impact on assessment, and how these practices align (or fail to align) with Bloom's taxonomy.

Bloom's taxonomy is a framework widely used in education. It organises cognitive (thinking) skills into levels, from basic (remembering and understanding), to advanced (creating and evaluating).

Several key patterns emerged from our analysis:

Firstly, AI excels at lower-level tasks. Studies show that AI is strong in remembering and understanding. It can generate multiple-choice questions, definitions, or surface explanations quickly and often with high accuracy.

Secondly, AI struggles with higher-order thinking. At the levels of evaluating and creating, its effectiveness drops. For instance, while

AI can draft a business plan or a healthcare policy outline, it often lacks contextual nuance, critical judgement and originality.

Thirdly, the role of university teachers is changing. Instead of spending hours designing and grading lower-level assessments, they can now focus on scaffolding tasks that AI cannot master alone, thus promoting analysis, creativity and self-directed learning skills. Self-directed learning is defined as “a process where individuals take initiative to diagnose their learning needs, set learning goals, find resources, choose and implement strategies, and evaluate their outcomes, with or without assistance from others.”

Lastly, the opportunities AI presents seem to outweigh the threats. While concerns about cheating remain real, many studies highlight AI's potential to become a learning partner. Used well, it can help generate practice questions, provide feedback, and stimulate dialogue (if students are guided to critically engage with its outputs).

All these challenges prompt universities to move beyond “knowledge checks” and invest in assessments that not only measure deeper learning but promote it as well.

How to promote critical thinking

So how can universities move forward? Our study points to several clear actions:

- Redesign assessments for higher-order thinking skills: Instead of relying on tasks that AI can complete, university teachers should design authentic, context-rich assessments. For example, using case studies, portfolios, debates, and projects grounded in local realities.

- Use AI as a partner, not a threat: Students can be asked to critique AI-generated responses, identify gaps, or adapt them for real-world use. This transforms AI into a tool for practising the ability to analyse and evaluate.
- Build assessment literacy among university teachers: University teachers need support and training to create AI-integrated assessments.
- Promote AI fluency and ethical use: Students must learn not just how to use AI, but how to question it. They must understand its limitations, biases and potential pitfalls. Students should be made aware that transparency in disclosing AI use can support academic integrity.
- Encourage the development of self-directed learning skills: AI should not replace the student's effort, but rather support their learning journey. Hence, designing assessment tasks that foster goal setting, reflection and peer dialogue is crucial for developing lifelong learning habits.

By fostering critical thinking and embracing AI as a tool, universities can turn disruption into opportunity. The goal is not to produce graduates who compete with machines, but to cultivate independent thinkers who can do what machines cannot: reflect, judge, and create meaning. Assessment in the age of AI could become a powerful force for cultivating the kind of graduates our world needs.

Anitia Lubbe is Associate Professor, North-West University

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<https://theconversation.com/universities-can-turn-ai-from-a-threat-to-an-opportunity-by-teaching-critical-thinking-266187>



'DOUGHNUT ECONOMICS' SHOWS HOW GLOBAL GROWTH IS OUT OF BALANCE – AND HOW WE CAN FIX IT

Warwick Smith



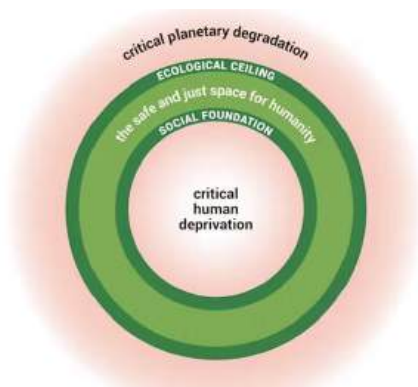
A new update to an influential economic theory called “Doughnut Economics” shows a global economy on a collision course with nature.

The influential book by Kate Raworth, *Doughnut Economics: Seven Ways to Think Like a 21st Century Economist*, was first published in 2017. It was lauded for its ability to convey the complexity of global social and environmental issues in a single, easy-to-understand diagram.

The doughnut shape represents the safe and just operating space for humanity.

The hole at the centre of the doughnut represents a shortfall in the social foundations necessary for people to live safe and just lives.

The area outside the doughnut shows ecological overshoot across a range of domains, such as climate change, biodiversity loss and ocean acidification.



Now, Andrew Fanning and Kate Raworth have published the first update to the Doughnut Economics framework since 2017 in *Nature*.

The update should prompt us to ask serious questions about our society, economy and notions of progress.

A global movement

Since the book was published, doughnut economics has evolved into something of a global movement, at the centre of which is the Doughnut Economics Action Lab (DEAL). Many places, including Melbourne, are using the framework to assess their social and ecological condition and trajectory.

Doughnut economic thinking also aligns with Australian First Nations' view of Country – the economy, society and environment all as a single, inseparable thing. An Indigenous consultancy, Dinadj, is working to develop an Indigenous doughnut for Australia.

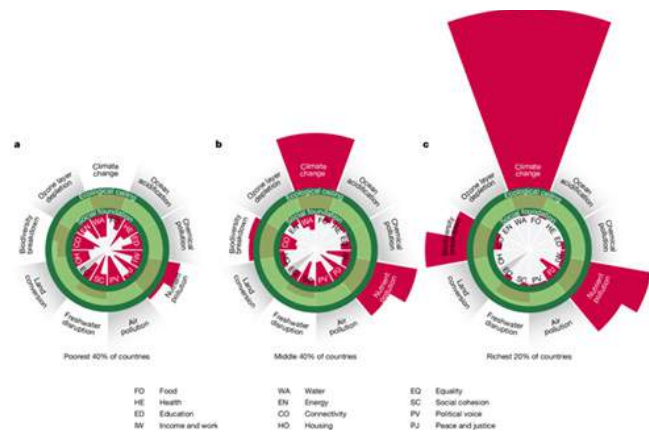
The original global doughnut portrait was a static picture at a single point in time. The recently published update turns this into an annual time series spanning from 2000 to 2022. This means we can now monitor trends in global social and ecological health over time.

What these trends show is alarming.

While global gross domestic product (GDP) has more than doubled, progress on meeting social foundations has slowed and ecological overshoot has accelerated. In other words, we are damaging critical biophysical processes at a faster rate than we're improving people's lives.

The update shows an overshoot on six of the nine critical global planetary boundaries. Separate published research indicates we've since crossed a seventh boundary, ocean acidification.

Raworth's conceptual doughnut 3.0 – comparing 2000 to 2025



Rich nations dominate the damage to the environment

The other important change in this update is the breakdown of data by nation, allowing comparison between groups of countries. This illustrates the unequal nature of economic development and the trade-off between social foundations and ecological overshoot that the current economic system creates.

The richest 20% of nations, home to 15% of the global population, are responsible for 44% of the global ecological overshoot (going beyond the safe space for humanity). But they have only a 2% share of the shortfall in social foundations, in areas such as food insecurity, health and education.

Meanwhile, the poorest 40% of countries, with 43% of the population, account for only 4% of the ecological overshoot but 63% of the social shortfall.

While progress has been made across a range of social domains, shortfalls remain alarming. About 75% of the global population say they perceive widespread corruption in government and business. Some indicators are going backwards, most notably a rise in autocratic regimes and food security.

What does progress really mean?

The updated doughnut framework adds to the weight of evidence that the dominant economic narrative – which equates economic growth with progress – is leading us towards multiple environmental crises. And it's falling short on delivering social progress.

In Australia, a recently released report, Growth Mindset from the Productivity Commission, is a clear illustration of this disconnect between economic goals and social and environmental health.

The commission chair, Danielle Wood, told the National Press Club:

Governments must bake in the process of asking themselves: what have you done for growth today?

Tellingly, the report barely touches on poverty, inequality, biodiversity or the environment. It makes no mention of the impact that growth (particularly from rich countries like Australia) is having on critical planetary boundaries.

However, there are many initiatives emerging from governments, businesses and civil society around the world and in Australia that reflect the need for different definitions of progress.

At the national level, we have Measuring What Matters. This framework was developed by Treasury at the request of Treasurer Jim Chalmers and "will track progress towards a more healthy, secure, sustainable, cohesive and prosperous Australia".

The Australian Capital Territory has a well-developed wellbeing framework that provides a holistic guide to government decision-making. Every state government is also engaging with these questions, with an explicit wellbeing focus in Tasmania, Victoria, New South Wales and South Australia.

It's early days for all of these government initiatives, but it's a good sign so many are starting to take these challenges seriously.

The Melbourne Doughnut city portrait was adapted for Australia by community organisation Regen Melbourne and featured as one of two examples in the Nature article. It confirms our place in the global distribution with relatively low levels of social deprivation and very high levels of ecological overshoot.

The doughnut economics image illustrates with great clarity the complex challenges faced by human society in the 21st century.

The recent update shows it's more important than ever that we think carefully about what progress means and we repurpose our economy away from its destructive focus on growth at all costs and towards human and environmental flourishing.

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<https://theconversation.com/doughnut-economics-shows-how-global-growth-is-out-of-balance-and-how-we-can-fix-it-266889>



GOOGLE JUST DODGED A MAJOR PENALTY IN THE COURTS – HERE'S WHAT HAPPENS NEXT

Rob Nicholls

Google will not have to sell its Chrome web browser in order to fix its illegal monopoly in the online search business, a United States federal judge has ruled. It will, however, need to do a few other things, such as sharing data with rival companies, in order to improve competition.

The remedies ruling was handed down by DC District Court Judge Amit Mehta, who last year found Google had violated antitrust laws in relation to its online search business.

This was not the worst-case scenario for Google, and the share price of its parent Alphabet rose 8% after the news. But the ruling could still have a significant impact on the tech giant – and the entire internet.

What was the case actually about?

The US Department of Justice (DOJ) filed its antitrust suit against Google in 2020, arguing the tech giant had used exclusive agreements with device makers such as Apple and Samsung to unfairly box out competitors from the search engine market.

For years, Google accounted for reportedly 90% of all search queries in the US, using what the DOJ called “anticompetitive tactics” to maintain and extend its monopolies in search and search advertising.

In August 2024, Judge Mehta ruled in the DOJ's favour, finding Google had maintained an illegal monopoly.

The case centred on Google's practice of entering into exclusionary agreements that collectively locked up the primary avenues through which users access online search, making Google the pre-set default general search engine on billions of mobile devices and computers – and particularly on Apple devices.

The remedies – proposed and actual

The DOJ urged the sell-off of the Chrome browser and possibly its Android operating system, and the sharing of search data. It said these remedies would limit Google's ability to monopolise the search market and prevent it from gaining an unfair advantage in other markets, notably artificial intelligence (AI).

The DOJ also demanded an end to its multibillion-dollar agreements with Apple and other partners.

Judge Mehta's remedies ruling fell significantly short of the DOJ's harshest demands.

Under the remedies ordered, Google will be barred from entering or maintaining exclusive contracts relating to the distribution of Google Search, Chrome, Google Assistant, and the AI-powered Gemini app.

Google cannot enter agreements that condition the licensing of any Google application on the distribution or placement of these products, or condition revenue share payments on maintaining these products on any device for more than one year.

Google must also provide competitors with access to its search results and advertising services at standard rates. This will help them to deliver quality search results to their own users while building their own technology.

However, Google will not be barred from paying device makers to preload its products, including Google Search and generative AI products.

A technical committee will be established to help enforce the final judgment, which will last six years and go into effect 60 days after entry. Judge Mehta ordered the parties to meet by September 10 for the final judgment.

Shortly after the judge's ruling, Google released a statement reiterating its opposition to the initial ruling in August 2024, which it still plans to appeal.

More cases to come

This decision opens up competition in the search market while allowing Google to maintain its core business structure. The data-sharing requirements could particularly benefit AI competitors who need large datasets to train their models.

Google faces additional antitrust pressure beyond this search case. In April 2025, US District Judge Leonie Brinkema found Google illegally monopolised advertising technology markets. The remedies trial for that case is scheduled for later this month.

As William Kovacic, a global competition law professor at George Washington University and former Federal Trade Commission commissioner, told TechCrunch:

Google's competitors, however, believe the remedies should have been more severe in this case.

In a statement, Gabriel Weinberg, the chief executive of search engine competitor DuckDuckGo, claimed Google “will still be allowed to continue to use its monopoly to hold back competitors, including in AI search”. He also called on the US congress to step in “to swiftly make Google do the thing it fears the most: compete on a level playing field”.

It seems likely the DOJ will need to demonstrate abuse of dominance in the AI search field to get a remedy that will satisfy DuckDuckGo.

The full resolution of these cases likely won't occur until late 2027 or early 2028, as Google has indicated it will appeal both the liability and remedy decisions.

Rob Nicholls is Senior Research Associate in Media and Communications, University of Sydney

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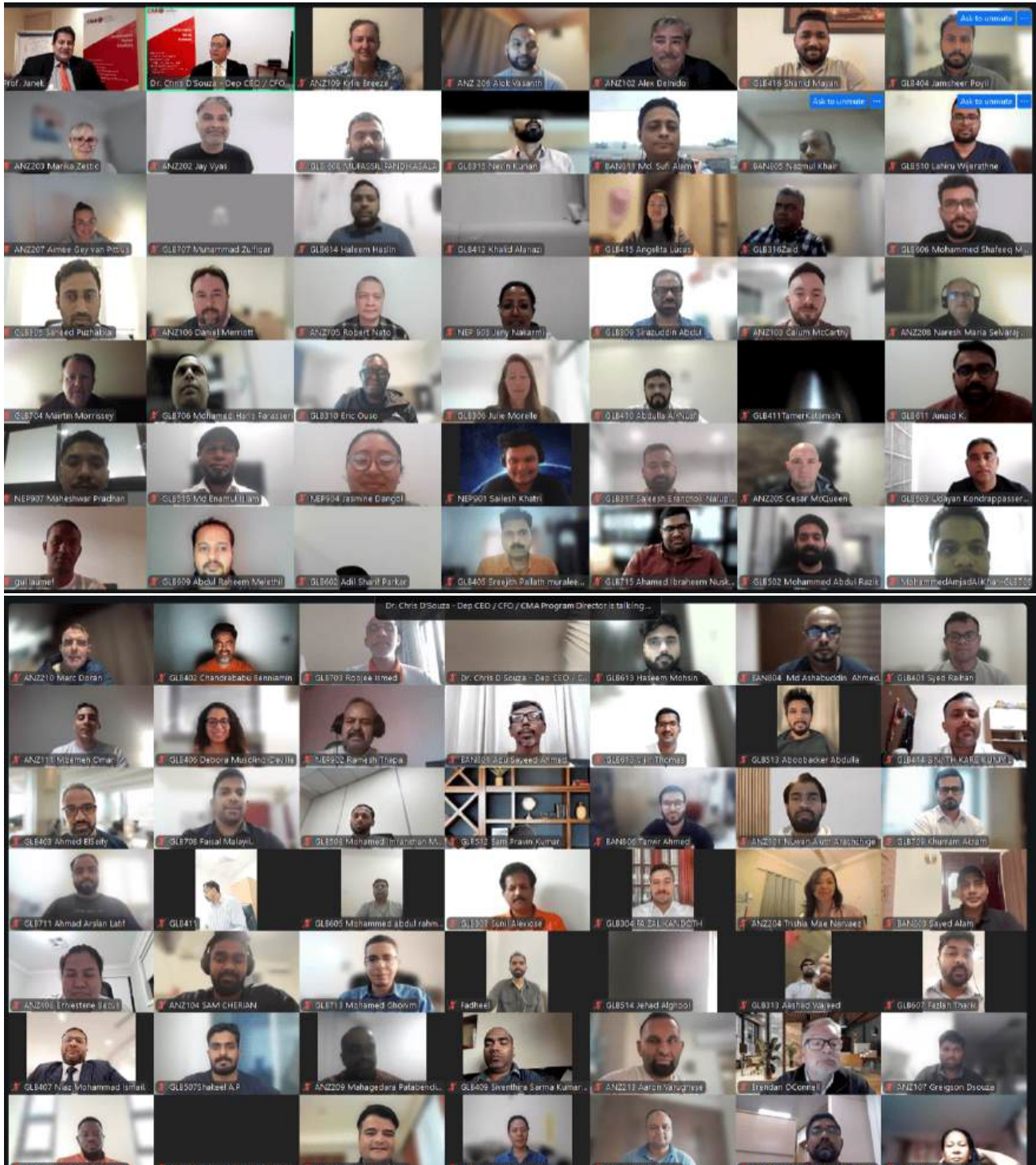
<https://theconversation.com/google-just-dodged-a-major-penalty-in-the-courts-heres-what-happens-next-264473>

REGIONAL OFFICE & BRANCH NEWS

Australia

CMA Global Zoom Australia & New Zealand 11th Global Zoom CMA Program

The Eleventh Global Zoom CMA Program was held over 3 weekends in September 2025. It was an immense success with 145 participants from 25 countries. It commenced at 1pm AEDT and finished at 9pm each day. The most participants were from Australia and New Zealand. There were those who tuned in from Canada at Midnight the day before; and from New Zealand who finished after midnight the day following! There were also participants from Europe, Africa, Saudi Arabia, Qatar, Bangladesh, Nepal, India, Sri Lanka and Mauritius.



The presenters were Prof Janek Ratnatunga, Prof Brendan O'Connell and Dr. Chris D'Souza. Given the incredible logistics involved, it was a team-teaching effort on all the days. From the comments posted in the chat boxes; it was extremely well received. Special commendation must go to Mr. Kapila Dodamgoda, who is responsible for marketing the Global GMA conversion program and Mr. Kumar Khatiwada the Regional Director of Nepal, for once again promoting the program.

Sri Lanka

Sold Out- Face-to-Face 7-Day Intensive CMA Program in Sri Lanka

From September 20 to 28, 2025, the *Academy of Finance* and ICMA successfully delivered the 25th 7-Day Intensive CMA Program in Sri Lanka. Professor Janek Ratnatunga and Mr. Kapila Dodamgoda successfully delivered the course in face-to-face mode at the Galle Face Hotel in Colombo Sri Lanka. The program is offered exclusively by the *Academy of Finance* in Sri Lanka. Over 70 senior managers including CEOs and CFOs from all sectors of the Sri Lankan economy including bankers, manufacturers, and NGOs attended this program. This program also attracted several international participants including the former finance minister of the Maldives.



The full-house of the participants of the CMA Qualifying Program held at Galle Face Hotel in September 2026.



Mr. Kapila Dodamgoda, Regional Director Sri Lanka and Professor Janek Ratnatunga, CEO of ICMA(ANZ); and, with the participants of the CMA Qualifying Program held at Galle Face Hotel in September 2026.

CMA Australia Signs MoU with the University of Jaffna

The Institute of Certified Management Accountants (Australia) entered into a Memorandum of Understanding (MoU) with the University of Jaffna on 18th August 2025, marking a significant milestone in strengthening collaboration between academia and the accounting profession in Sri Lanka.

The MoU was formally signed by Prof. S. Srisatkunarah, Vice-Chancellor of the University of Jaffna, and Mr. Kapila Dodamgoda, Regional Director – ICMA (Australia), Sri Lanka Region.

The signing ceremony, held at the University's Faculty of Management Studies and Commerce, was attended by senior academics, faculty members, and representatives of CMA Australia. The partnership aims to provide students with access to globally recognised professional pathways, industry exposure, and opportunities to enhance their employability in the evolving world of finance and management.

This collaboration reinforces CMA Australia's commitment to bridging academic excellence with professional practice and developing the next generation of finance leaders in Sri Lanka.



Indonesia

Conference on Accounting and Accountability in Emerging Economies (AAEE)



Hundreds of experts, academics, and professionals from around the world attended the *4th Biennial Emerging Scholars Colloquium and Conference on Accounting and Accountability in Emerging Economies (AAEE)* held on June 25–27, 2025, in Bali.

During the conference, 155 participants from five continents and 17 countries presented and discussed research findings related to accountability and sustainable development in developing countries. Delegates came from South Africa, Australia, Bangladesh, the Philippines, Canada, South Korea, the United Kingdom, Ireland, Japan, Malaysia, Nigeria, Papua New Guinea, Palestine, Saudi Arabia, Uganda, and Jordan.

ICMA (Australia & New Zealand) also supported the event by providing AUD 1,000 in awards for Best Paper, Runner-Up Paper, and Best Emerging Scholar Colloquium Paper.

The **Best paper** was awarded to *Mohammed Alshurafa*, for the paper titled, “*Framing Accountability Through Decolonial Struggles: Palestinian Human Rights Activists in Context*”, and the **1st Runner-Up** was *Taufiq Choudhry* for the paper titled, “*Volatility Spillover between the Oil Market and Stock Market: Evidence from Oil Revenue-Dependent Countries*”.

Petra International Business and Accounting Conference (PIBACC) 2025



Petra International Business and Accounting Conference (PIBACC) 2025 held on June 30 – July 1, 2025, at Petra Christian University Surabaya, the conference themed “*Innovating for a Sustainable World*” convened international academics, industry leaders, and policymakers to explore strategies for sustainable economic growth.

ICMA Australia & New Zealand also supported the event by providing AUD 500 in awards for Best Abstract and Best Presenter.

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CMA EVENTS CALENDAR

- **November 8-16, 2025:**
CMA Program Workshop organised by SMART Education Group, Dubai.
- **November 27-30:**
CMA Regional Directors' Summit. Manila, Philippines.
- **February 14-20, 2026:**
CMA Program Workshop, Jakarta, organised by RAD Indonesia
- **Feb 28- March 2, March 7-8 & 14-15, 2026:**
Twelfth CMA Global Zoom Program in Strategic Cost Management & Strategic Business Analysis, Syme Business School, Australia. (Zoom).
- **March 21-29, 2026:**
CMA Program Workshop organised by Academy of Finance, Sri Lanka.
- **April 11-19, 2026:**
CMA Program Workshop organised by SMART Education Group, Dubai.
- **April 25-27, 2026:**
Certificate of Proficiency in Strategic Cost Management, and April-30-May 3, 2026: Certificate of Proficiency in Strategic Business Analysis SMU Academy, Singapore (14th Intake). (Zoom).
- **April 26-May 4, 2026:**
CMA Program Workshop organised by SMART Education Group, Dubai.
- **August 1-7, 2026:**
CMA Program Workshop, Jakarta, organised by RAD Indonesia
- **August 29-31, 2026, Sept 5-7 & 12-13, 2026:**
Thirteenth CMA Global Zoom Program in Strategic Cost Management & Strategic Business Analysis, Syme Business School, Australia. (Zoom).
- **September 19-27, 2026:**
CMA Program Workshop organised by Academy of Finance, Sri Lanka.
- **Nov 7-15, 2026:**
CMA Program Workshop organised by SMART Education Group, Dubai.

PRIVATE PROVIDERS

Wharton Institute of Technology and Science (WITS), Australia

Syme Business School, Australia

Academy of Finance, Sri Lanka

IPMI (Indonesian Institute for Management Development), Indonesia

Singapore Management University Academy (SMU Academy)

Business Sense, Inc. , Philippines

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