

Transforming food production and service? A response to the White Paper Food AI: A game changer for Australia's food and beverage sector April 2024 October 2024

The White Paper *Food AI: A game changer for Australia's food and beverage sector* was published in April 2024.¹ The Paper was the result of 'a collaborative effort, informed by (a roundtable of) experts across industry, government, and academia, and explores AI's impact across the entire food supply chain, from farm to fork to consumers. The report highlights exciting possibilities: AI-powered tools that tackle complex challenges like optimising agricultural productivity, improved food safety and design foods preferred by consumers.'²

While I am comfortable with Food AI being used to enhance food production and quality, reduce waste and create sustainable products I have some questions about the process of developing AIs and the benefits for the consumer. One over-arching concern is the role of consumers in the development, roll-out, and monitoring of Food AIs.³ Consumers are most often mentioned in the Paper when they are the recipients of some perceived benefit from Food AIs. They are never partners in Food AI development or operations: for example, *Collaboration is key, with partnerships between agri-food scientists, businesses, and AI experts crucial for unlocking AI's potential.*⁴ The Paper stresses the need for *transparency to build consumer trust.* The first steps in building consumer trust is to bring consumers into the AI development at its earliest stage, keep and support them within the partnership as the AI project is conducted, and be a party to interpreting the results of the AI project.

'The potential of AI in food is too significant to be confined to labs or corporate boardrooms. It's a conversation that needs to involve everyone – farmers, scientists, designers and policy makers alike.'⁵

To which I add consumers.

So let me as a consumer, albeit an educated, well-resourced one from a culturally diverse background -Sri Lankan Burgher, with a beginner level understanding of AI, respond to the Paper. I do this not by critiquing the recommendations but by raising questions about the Food AI development processes outlined in the Paper and the benefits the Paper says accrue to the consumer. I have questions about the data gathering proposed for the development of AIs, particularly around data sovereignty. I question the use of some of the terms in describing the benefits of Food AIs, particularly culturally specific terms like creativity and nutrition let alone affordability. I question the equity of who benefits from Food AIs as envisaged particularly in the context of what I term the AI Divide. I question the apparent transformation of dining into a highly individualized activity and not the commensal activity it often is and will continue to be.

¹ McColl-Kennedy, Janet R., & Hine, Damian C. (2024). (eds.) *Food AI: A game changer for Australia's food and beverage sector*, White paper, Innovation Pathways Program, Australia's Food and Beverage Accelerator (FaBA), The University of Queensland, 84 pp..

² McColl-Kennedy et al 'Forward' p.2 (Their spelling not mine)

³ Bansal, N., Smyth, H., Andrews, R., Brea, E., Ivcevic, D., Lai, Y., Thomson, L.,& Zhang, W. (2024) *Optimising food manufacturing with AI*, in McColl-Kennedy, J.R., & Hines, D.C. (eds.) *Food AI: A game changer for Australia's food and beverage sector*, p.27

⁴ McColl-Kennedy et al p.11

⁵ *AI and Food: MOLD How Will AI Shape The Future Of Food - MOLD : : Designing the Future of Food.*

The response is informed by the Australian government's *Proposed mandatory guardrails for high-risk AIs*.⁶ These are Appendix 1. The response is also informed by the *Principles* which are Appendix 2. Arguably Food AI systems are high risk under proposed *Principle b. the risk of adverse impacts to an individual's physical or mental health or safety* and *d. The risk of adverse impacts to groups of individuals or collective rights of cultural groups*.⁷ The response is also informed by *AI and Food: MOLD How Will AI Shape The Future Of Food - MOLD : : Designing the Future of Food*.

Chapter 1. Transforming food production with AI

- *AI could be used to enhance food production and quality, reduce waste and create sustainable products.*⁸

This is a broad statement with which I can agree. It's the question of how investment in AI is balanced across these four goals that I would want to see addressed. For example, in accessing Research and Development (R&D) funds I wouldn't want to see investment in AI for improvement of food production happen at the expense of AI improvement to inform better systems for reducing waste or sustainability. Building in incentives/rewards for AI developments that target waste, and sustainability could be a way of ensuring this.

- *The challenge of profitable food production is further complicated by fluctuating global markets and changing consumer preferences in relation to health and sustainability awareness when it comes to the food products, they consume.*⁹

How responsive can Food AIs be to changing consumer preferences? Can it be seen as an opportunity and not a complication? For example, I think changing coffee consumer preferences from milk to alternatives – oat, soy, almond - opened the door to profitable food production of these alternatives, that it wasn't a complication but an opportunity.

- *Food producers, processors and consumers will be encouraged to proactively share their data if the benefit is clear and outweighs the risk.*^{10 11}

Consumers understandably would be reluctant to *proactively share their data* in a process in which they have no input and control.¹²

This is particularly the case for data gathering from Indigenous peoples expressed in a simple powerful phrase: 'nothing about us, without us'.¹³ Data gathering here may continue colonial

⁶ *Safe and responsible AI in Australia Proposals paper for introducing mandatory guardrails for AI in high-risk settings* Commonwealth of Australia September 2024 Proposed mandatory guardrail 3. Protect AI systems and implement data governance measures to manage data quality and provenance.p.35

⁷ See later discussion on physical and mental health impacts of AI recommendations.

⁸ McColl-Kennedy et al p.11

⁹ Cooper, M., Hickey, L., Jiang, X., La Fata, G., Lomas, H., Miller, T., O'Brien, S., Patel, P., & Tomarchio, S. (2024). Transforming food production with AI, in McColl-Kennedy, J.R., & Hine, D.C. (eds.) *Food AI: A game changer for Australia's food and beverage sector*, p.6

¹⁰ McColl-Kennedy et al p.11

¹¹ 3. Protect AI systems, and implement data governance measures to manage data quality and provenance

¹² McColl-Kennedy et al p.11

¹³ 'AI affects everyone – including Indigenous people. It's time we have a say in how it's built,' Tamika Worrell *The Conversation* 11 October 2024

practice where the Indigenous individual is the object of study and not an agent in the study. Tamika Worrell recently said in *The Conversation*. 'The AI industry and governments have largely ignored Indigenous people in the development and regulation of AI technologies. Put differently, the world of AI is too white.'¹⁴

Hawaiian and Samoan Scholar Jason Lewis says: 'We must think more expansively about AI and all the other computational systems in which we find ourselves increasingly enmeshed. We need to expand the operational definition of intelligence used when building these systems to include the full spectrum of behaviour we humans use to make sense of the world. Key to achieving this is the idea of "Indigenous data sovereignty". This would mean Indigenous people retain sovereignty over their own data, in the sense that they own and control access to it.'¹⁵

A similar situation applies to people from culturally and linguistically diverse backgrounds, some of whom may have come from backgrounds of being under surveillance, but many of whom may be excluded from presence in data sets from language barriers or specific cultural practises.

(We need) a more inclusive vision. One that doesn't just serve the needs of a few, but of many, especially those all too often excluded from the conversation.¹⁶

The Paper touches on this: 'As the AI models generate designs, these should be evaluated for their technical accuracy and appeal, practicality, and cultural relevance'.¹⁷ Cultural relevance/sensitivities should be part of the design of the AI itself. [Principle d. is pertinent here: d. *The risk of adverse impacts to groups of individuals or collective rights of cultural groups.*](#)

- *AI would enable consumers to make informed and healthy food choices with the goal to provide access to more diversified and affordable food products.*¹⁸

A question here is the breadth of the healthy food research data which AI will be crunching. For example, will the data include data collected from/by Indigenous consumers, consumers from culturally and linguistically diverse backgrounds, consumers from lower income brackets or consumers with a disability?

There is an assumption here that there is a need for greater diversification when the issue may really be one of affordability of current healthy food choices How will affordability be defined and by whom? For example, let's look at measuring housing affordability. 'Measuring housing affordability is not straightforward. A household's financial situation, the overall demand in the housing market and housing tenure type (whether a household is seeking to rent, is renting, is looking to buy or is a home owner with or without a mortgage) all influence individual housing affordability (Senate Standing Committees on Economics 2015). The simplest measure of housing affordability compares housing costs to gross household income.' What are the factors that can measure affordability in the food sector? Is it across the whole of food products, e.g. a measure of the cost of a whole basket of basic goods versus gross household income, or something more complex, the measure of a number of variables? What would these be? In housing affordability there is dissension between governments

¹⁴ Worrell, *The Conversation* 2024

¹⁵ 'Worrell ... *The Conversation* 11 October 2024.

¹⁶ MOLD

¹⁷ Marcellin, E., Barrett, N., Burke, M., Derbyshire, E., Dias Rincon, D., Ebert, B., Navone, L., Ronquest-Ross, L., Stokes, J., Talbo, M., & Turner, M. (2024). Embracing AI for innovative food design, in McColl-Kennedy, J.R., & Hine, D.C. (eds.) *Food AI: A game changer for Australia's food and beverage sector*, p.17

¹⁸ McColl-Kennedy et al p.11

on one hand and housing activists on the other as to what percentage marks housing unaffordability - 25% of income, 30% of income? What would be the percentage of income spent on food that identifies a product or a basket of products as affordable?

The goal here comes up against inequities in food delivery systems and in access to digital networks. I term this the AI Divide. This is discussed below.

Chapter 2. Embracing AI for innovative food design

- *AI's ability to analyse and interpret data offers unprecedented opportunities to enhance the efficiency, precision, and creativity of food design processes. This encompasses the development of new food products that are not only innovative but also specifically tailored to meet diverse consumer dietary needs and preferences.*¹⁹

'Efficiency', 'precision', 'creativity' are all loaded concepts depending on for whose purposes the terms are being used. I think consumers should be involved in setting the measures of efficiency and precision. The most difficult and perhaps contentious to measure is 'creativity'. Creativity is vastly different from different points of view. Case in point: pineapple rings in green jelly moulded in a tin. It may not meet the standard of creativity for a chef today but may well be, and indeed was in the late 50s, promoted to the home cook as a creative way to serve pineapple as a dessert with the added bonus of its efficiency - just open a can, drain the juice, make a jelly with jelly crystals, put the pineapple back in the tin, pour the jelly around it and let it set, and when it has just tip out the roll from the tin and get applause from the diners.

As for tailoring the product to 'meet the diverse dietary needs and preferences', products already do this. What more can AI add apart from coming to innovation and novelty swifter? I take up the issue later of 'new food products that are not only innovative but also specifically tailored to meet diverse consumer dietary needs and preferences'.

- *However, this is not without risks. Key elements intrinsic to food design, such as mouthfeel, texture, smell, and the nuances of culinary quantification and interpretation need to be considered. These aspects, fundamental to the essence of food design, demand an approach that AI must navigate to be effectively employed.*²⁰

Mouthfeel, texture, smell and visual appeal are culturally based. For example, Maldivian fish (smoked and dried skipjack tuna) is culturally valorised in Sri Lankan cuisine but for others not brought up on it is just smelly, hard to chew and excessively 'fishy' tasting. Closer to home it's commonplace to find Vegemite has no appeal for many Australian consumers, particularly those from cultural and linguistically diverse backgrounds like me. Is there multi-cultural sensory data from which to train AIs to 'navigate to be effectively employed'?

- *AI opens avenues for recommending novel recipes, creating unique and nutritious food items that may have previously been inconceivable without AI intervention.*²¹

¹⁹ Marcellin, E., Barrett, N., Burke, M., Derbyshire, E., Dias Rincon, D., Ebert, B., Navone, L., Ronquest-Ross, L., Stokes, J., Talbo, M., & Turner, M. (2024). Embracing AI for innovative food design, in McColl-Kennedy, J.R., & Hine, D.C. (eds.) Food AI: A game changer for Australia's food and beverage sector, p.16

²⁰ Marcellin, E., Barrett, N., Burke, M., Derbyshire, E., Dias Rincon, D., Ebert, B., Navone, L., Ronquest-Ross, L., Stokes, J., Talbo, M., & Turner, M. (2024). Embracing AI for innovative food design, in McColl-Kennedy, J.R., & Hine, D.C. (eds.) Food AI: A game changer for Australia's food and beverage sector, p.16

²¹ Marcellin et al p.16

Nutrition is also a contested space. For example, the burgeoning alternative health sector's supplements are often contested by other health practitioners. Who makes the decision as to which nutritional data an algorithm will crunch? How transparent will that be to consumers? Proposed mandatory guardrails 6 & 7 are pertinent here; *6. Inform end-users regarding AI-enabled decisions, interactions with AI and AI-generated content: 7. Establish processes for people impacted by AI systems to challenge use or outcomes.*

I also would be wary of novelty for novelty's sake. Will we see new foods developed through the imperative for an AI to justify its use for which an artificial market will then be created. For example, did anyone really want chicken parmigiana?

- *In addition to these roles, involving chefs and culinary experts in the process is essential to provide insights into the artistry and creativity of food design. Their experience with flavour combinations, presentation, and understanding of consumer preferences is essential to enhance the effectiveness of AI models in creating innovative and appealing food designs.*²²

Can I suggest that what is described here is already biased. The data set from chefs and culinary experts are already at a level that can lead to this. It's the kind of food that gets marketed through high end restaurants to the monied few and so rate poorly on an affordability measure. It's coffee table food. It's molecular gastronomy that never was prepared in the kitchen of an everyday consumer. What are the trade-offs the everyday consumer is willing to make for affordable food and not 'innovative and appealing food designs'?

Chapter 3. Optimising food manufacturing with AI

- *By fostering robust regulatory frameworks, encouraging industry academia collaborations, and prioritising workforce development, the sector can move towards a future where food manufacturing is not only more efficient and sustainable but also closely aligned with societal values, consumer needs and global market demands.*²³

What societal values are meant here? Australia is a multicultural nation in which there is robust debate about different societal values. For example, sustainability may not mean the same thing for an urban elite and a primary producer. Proposed mandatory guardrails 6 & 7 address this: *6. Inform end-users regarding AI-enabled decisions, interactions with AI and AI-generated content: 7. Establish processes for people impacted by AI systems to challenge use or outcomes.* In the example of sustainability, the primary producer may place the emphasis for the sustainability on the use of chemical interventions and monocropping. The urban elite may place it on permaculture. Both should be told how the AI program came up with one or other of these or entirely alternative solutions and be able to challenge the conclusion.

What happens when local consumer needs are not matched to global market demands? The decision to go either way maybe an economic one. How transparent will the AI operations be to scrutiny by local consumers in the advent that it is the global market that is preferred.

²² Marcellin et al p.17

²³ Bansal et al p.27

- *The deployment of AI requires substantial computational resources and specialised hardware, which may not be readily available or economically feasible for all manufacturers.*²⁴

How can AI development mitigate against this?

- *However, there is a notable skills gap in the industry, with a shortage of professionals who possess both the technical and domain specific knowledge needed to develop and implement AI solutions effectively. This skills gap presents a significant challenge for food manufacturers, necessitating investment in training and development programs to equip their workforce with the necessary skills.*²⁵

Is the skills gap quantified? If this is an industry wide issue why not lobby for government investment in training and development programs fully or in some shared cost arrangement? I would imagine the TAFE sector would be the appropriate service deliverer. With TAFE decimated in the last few years it will take considerable funds to bring new courses into the sector.

- *Furthermore, manufacturers must ensure that AI applications comply with food safety standards and regulations, which may vary significantly across different jurisdictions. Navigating these regulatory and compliance hurdles is crucial for the successful implementation of AI in food manufacturing.*²⁶

I agree this is an issue. Are there examples now in the food space of managing cross-jurisdictional compliance with food safety standards and regulations?

- *Food manufacturers must address these concerns by implementing AI solutions that are not only efficient and effective but also ethically responsible and transparent in their operations.*²⁷

I agree with MOLD that 'Biases creep into AI via datasets, the things they are trained on or unconsciously via the humans who develop them ... We need to build AI systems that are transparent, that openly acknowledge and mitigate their biases, and that involves many different people involved in their creation.'²⁸ As a bottom-line consumers should be party to defining efficiency and effectiveness.

- *As AI takes a more prominent role in food manufacturing, consumer acceptance and trust present significant hurdles.*

Again, I stress the importance of working with consumers in developing Food AIs to build both acceptance and trust.

- *Despite all the challenges, AI has significant potential to not only address current manufacturing challenges but also to unlock new potentialities, driving the food and beverage sector toward a more adaptable, sustainable, and consumer-focused future.*

²⁴ Bansal et al p.28

²⁵ Bansal et al p.28

²⁶ Bansal et al p.29

²⁷ Bansal et al p.29

²⁸ MOLD

Having consumers as partners from the start would go a long way to being genuinely consumer-focused.²⁹

- *AI-driven systems can enhance food safety by continuously monitoring production processes and analysing vast datasets to predict and prevent potential hazards before they impact product quality.*

No argument on this one from me.

- *This innovative approach will allow for the customisation of food items, catering specifically to the unique health requirements, taste preferences, and nutritional goals of each consumer.*³⁰

How customised and in what settings do you think this is possible/desirable? See my later questions about this.

Chapter 4. AI for improved food logistics and distribution

- *Customer preferences are dynamic and change over time. Customers across food supply chains are increasingly seeking diverse, sustainable, and locally sourced products. This challenges traditional supply chain models that are largely geared toward efficiency and the transportation of processed foods.*³¹

It will be a welcome change if this happens. Is this where Direct To Customers (DTC) models offer alternatives?

- *AI could be pivotal in shaping and influencing policy and regulatory frameworks, catalysing positive corporate change.*

All the more reason to have consumers as partners. Policy not informed by consumers is bad policy.

- *Lastly, the concept of provenance (farm to fork or fork to farm), tracing products back to their origins, brings a renewed focus on supply chain transparency and traceability down to a genetic level in an organism, and very high resolution (for instance square miles/metres) geospatially. These are essential to meet the consumer demand for authenticity and visibility at all points along the chain, underscoring the need to replace opacity with clarity to ensure ethical and sustainable practices.*³²

I agree with the proposition to 'replace opacity with clarity to ensure ethical and sustainable practices' to meet consumer demand for 'authenticity and visibility'. Again, how can consumers be involved along the supply chain and not just at the 'fork end'? Proposed mandatory guardrail 5 is pertinent: *Enable human control or intervention in an AI system to achieve meaningful human oversight.*

²⁹ Bansal et al p.30

³⁰ Bansal et al p.32

³¹ Sinha, A., Hine, D., Arango, L., Farr, J., Gaudry, J., Korale Gedara, P., Magor, S., Nalatu, S., & Smith, A. (2024). AI for improved food logistics and distribution, in McColl-Kennedy, J.R., & Hine, D.C. (eds.) Food AI: A game changer for Australia's food and beverage sector, p. 37

³² Sinha, A. et al p.39

- *Customers all along the chain have ethical concerns that may include issues related to fair trade, food safety, animal welfare, and environmental sustainability. This information is increasingly available to make informed decisions. However, price remains a major aspect of the purchase decision.*³³
- *This DTC model will be a win-win for all sides, as shortening the supply chain allows consumers access to affordable and fresh food directly from the farm while the farmers receive a fairer share of the revenue.*³⁴

Which consumers benefit from DTC models? I imagine that at present there are some inequities in DTC models like the presence or otherwise of Farmers' Markets. Do consumers in rural and remote areas have access to DTCs? Similarly for remote Indigenous communities hostage to the single store. This seems to me a place where money ought to be spent on R & D of alternative models of food distribution.

Chapter 5. AI for transforming food services

- *However, it is essential to balance the integration of AI robotics with the industry's human-centric aspects, ensuring that technological advancement complements, rather than replaces, the human touch that is fundamental to hospitality... Basic AI systems are used in self-service kiosks or digital ordering platforms. These systems follow predefined rules to process customer orders without any advanced decision-making capabilities. Service robots in a restaurant are programmed to bring food to tables or carry out simple delivery tasks. While they typically follow designated paths and have basic obstacle avoidance systems, service robots and digital ordering interfaces often require human assistance to handle requests that fall outside of their pre-programmed capabilities.*³⁵

I don't have any objections to using rule-based robots in these food delivery systems to undertake 'repetitive and straightforward tasks'. Mechanisation at this level has been with us now for nearly a century and a half with concomitant displacement of human beings and reorganisation of the workplace. I recently dined at a restaurant where a single robot was involved in getting food to the table, albeit followed closely by waitstaff who actually got the food on to the table. It wasn't particularly disturbing. I asked friends of mine who have experienced it what their experience was like. Some of their responses are Appendix 3.

Proposed mandatory guardrail 5 is pertinent: *Enable human control or intervention in an AI system to achieve meaningful human oversight.*

- *A single service robot on the market would typically cost restaurant operators around \$20,000 annually where no in-house technical support is available. Despite the substantial investment in technology, measuring and securing its return on investment is challenging, as a significant portion of customers still exhibit a general reluctance or distrust towards technology.*³⁶

³³ Sinha, A. et al p.40

³⁴ Bansal et al p.42

³⁵ Lee, A., Akhlaghpour, S., Bougoure, U., Breidbach, C., Kriz, A., Ryland, J., Subedi, Y., Van der Pols, J., & Wang, M. (2024) AI for transforming food services", in McColl-Kennedy, J.R., and Hine, D. C (eds.) Food AI: A game changer for Australia's food and beverage sector, p. 46

³⁶ Lee, A. et al p.48

I suspect this is in part a generational issue.

- *Advanced AI service robots equipped with face or voice recognition modules can offer personalised recommendations, remember customer preferences, and even greet repeat customers by name. This level of personalisation, driven by data and machine learning, can significantly enhance the customer experience.*³⁷

This I find a questionable proposition. But then I don't have smart speakers in the house, like Alexa. There is a difference between my barista knowing what my preferred coffee is and a machine doing so. It's intangible but it's there. I wonder how it will work when there is more than one customer in a group, family or otherwise.

But most serious here is the amount of personalised data which if hacked could have serious consequences. I think it is axiomatic that as AI technologies become increasingly sophisticated, so the risk of misuse also increases. What assurances can there be to customers that their personal data will not be on sold to a third party? What is their redress if it is? What if a customer did not want this data collected, would they then be denied service, which may well be illegal? Why not use synthetic data?

- *AI can provide tailored data-driven insights for customer orders, factoring in unique dietary needs, gut health concerns, or food intolerances, thus playing a crucial role in addressing broader public health issues.*

At the societal level I would think there are already other points in the health system where this data collected. more securely.

- *The integration of AI and robotics into the food service industry marks substantial progress towards adopting more sustainable and ethically responsible business operations.*³⁸

I don't think the White Paper offers any convincing arguments or examples for this.

Chapter 6. AI enhancing consumers' food experience

- *Through the data collection and processing capabilities of AI systems integrated into their existing customer journey processes, these organisations can autonomously conduct consumer targeting and profiling at the individual consumer level and offer personalised offerings to increase the likelihood of purchase.*³⁹

My main concern here is for what I will call the AI Divide. Just as we had/have a digital divide between those savvy about digital technology, able to access it, and able to use it to the greatest benefit for them and those for whom none of these apply. I suspect this will be mirrored in an AI Food divide. How can consumers on the dearth side of the divide feel they are in control?

There also already are inequities in the food service system between metropolis and rural and remote communities where for the latter food choices are limited. For example, Indigenous

³⁷ Lee, A. et al p.48

³⁸ Lee, A. et al p.48

³⁹ McColl-Kennedy, J., Coote, L., Andrade, J., Culpepper, S., Dick, M., Lee, M., Pham, T.R., Septianto, F., Tarbit, J., Willer, F., & Witheriff, M. (2024) *AI enhancing consumers' food experience*, in McColl-Kennedy, J., & Hine D.C. (eds.) *Food AI: A game changer for Australia's food and beverage sector*, p.58

communities who are hostage to the one food outlet. This is also true of consumers for whom there are limited choices under religious or other cultural rules, for example halal practices in Muslim communities or Buddhist communities who are strict vegetarians. Healthy food options or ethically sourced ones may be more expensive, the latter certainly are.

Consumers often eat in groups – family ,friends, colleagues - at home, at a restaurant, at conferences, workshops etc. How will ‘personalised offerings’ operate with these groups in these situations? I have had the experience of being able to pre-order food at a conference for 100 people and having the dietary needs or personal preferences catered for by food clearly marked – vegan, vegetarian, gluten – free, lactose intolerant etc. without having to give personal data on participants with those needs/ preferences other than first names. I have spoken with people who have ordered food via a tablet in a restaurant where again no personal data was collected. There is some resistance to ordering via a QR code as it often sets up an account for the individual via there smart phone and so collects personal data.

- *Bringing these two themes together – the importance of food and beverage expenditure and growth in the use of AI – has the potential to yield important insights into consumer behaviour and marketing practice. For example, the insights this research can generate could be used to design AI systems that satisfy, even delight, consumers’ cognitive and emotional needs.*⁴⁰

I can go with systems that satisfy cognitive needs if there is either no personal data capture or the least amount of personal data capture to do this. I am wary of looking to Food AI to satisfy my emotional needs. The White Paper recognises that recommendation systems may give the consumer recommendations that are in conflict *with dietary patterns that health experts recommend.*⁴¹ The White Paper does not discuss the possibility of recommendation systems leading to poor emotional and mental health outcomes. There are already plenty of occasions where unhealthy food habits are the result of looking to food to meet emotional needs. For example, using alcohol for this, or leading to eating disorders.

- *AI can track how customers feel during customer experiences.*⁴²

I strongly support consumers having this level of control at whatever the ROI (Return On Investment). But I cannot support that consumers who opt out of this should be penalised by ‘*receiving no benefits from AI usage*’, particularly in the light of the AI divide and structural inequities.

- *“this can be implemented from a policy perspective by providing each Australian consumer with their own personalised version of the European Union General Data Protection Regulation (GDPR)”. This personalised approach involves each consumer selecting the level they want to receive benefits from their data being collected and exposure to AI systems, relative to the privacy trade-offs they are willing to accept. Likewise, consumers could set their profile so that food and beverage providers cannot collect any personal data or utilise AI-enabled touchpoints, at the expense of receiving no benefits from AI usage. Although this approach may reduce the ROI of AI system integration, increasing consumer trust in AI systems is critical to ensure successful adoption of these technologies and to ensure AI usage is viewed as beneficial by consumers.*⁴³

⁴⁰ McColl-Kennedy, J. Coote, L. et al p.59

⁴¹ McColl-Kennedy, J. Coote, L. et al p.63

⁴² McColl-Kennedy, J. Coote, L. et al p.60

⁴³ McColl-Kennedy, J. Coote, L. et al pp.62-63

See comments above re AI divide and inequities in the food system.

- *Recommendation systems are designed to serve options that will appeal to consumers, but those options may not be consistent with dietary patterns that health experts recommend.*⁴⁴

Why would a recognition system be built that would do the latter? Surely it's part of meeting health safety requirements for an enterprise. It is against *Principle b. The risk of adverse impacts to an individual's physical or mental health or safety.*

- *Moreover, we predict that algorithm training and reinforcement processes will shift away from large scale toward limited training models based on individual consumers who consent to providing their data.*⁴⁵

I am quite comfortable with this as long as it is genuine informed consent that is given.

Chapter 7. AI for designing responsible and resilient food systems

- *Incorporating artificial Intelligence (AI) into food systems requires an approach that balances ethical responsibility with technological innovation. From AI-designed sustainable food systems transitions, to ensuring greater food safety and quality assurance, when the right balance is achieved, there is a strong possibility of achieving resilient food systems that are not only efficient but also ethically aligned with long-term social, cultural, and environmental goals.*⁴⁶

I agree with this with the caveat that as MOLD cautions: 'Technology we are often told, offers the solution .. but there's also the risk that AI will be used to prioritise convenience and profit, repeating the same mistakes that have led to monoculture farming and ecosystem devastation. How do we steer new systems away from entrenching existing issues and towards alleviating them?'⁴⁷

- *The development of AI systems requires a collective effort by all stakeholders. However, this requires ensuring all stakeholders have equitable access to this data and technology (Mehrabi et al., 2020). Our panel of experts noted that this not only involves prioritising stakeholder accessibility, but also ensuring inclusivity, the development of skills and knowledge, and transparency to empower stakeholders to adopt and use the technology while building a social license that can adapt and evolve.*⁴⁸

These are congruent with the concerns I have raised.

- *First, AI provides opportunities to accelerate R&D by helping identify and design innovative and improved alternatives to traditional food products.*⁴⁹

⁴⁴ McColl-Kennedy, J. Coote, L. et al p.63

⁴⁵ McColl-Kennedy, J. Coote, L. et al p.65

⁴⁶ Ko, R., Gain, A., Bongiovanni, I., Browne, W., Jarkas, O., Uhlmann, K., & Viller, S. (2024) *AI for designing responsible and resilient food systems*, in McColl-Kennedy, J.R., and Hine, D.C. (eds) *Food AI: A game changer for Australia's food and beverage sector*, p.70

⁴⁷ *AI and Food: MOLD How Will AI Shape The Future Of Food - MOLD : : Designing the Future of Food.*

⁴⁸ Ko, R., et al p.71

⁴⁹ Ko, R., et al p.74

At the start of this paper, I urged equity in R & D between enhancing food production and quality, reducing waste and creating sustainable products.

- *Third, there are opportunities to address stakeholder concerns related to data sovereignty and control. Deploying AI solutions with built-in privacy controls also empowers stakeholders to maintain control over their data, addressing concerns of provenance, privacy, actionability, and business continuity.*

I have earlier said that data sovereignty is fundamental particularly with Indigenous consumers. It also satisfies Proposed mandatory guardrail 7 *Establish processes for people impacted by AI systems to challenge use or outcomes*

- *AI can assist the food industries by considering an array of factors such as population dynamics, geographic constraints, and sustainability metrics to design food systems that are robust and aligned with regulatory, health and environmental objectives.⁵⁰*

As I have said earlier, consumers should be involved in decision making on the metrics and the interpretation of results.

Concluding Remarks

This has been a consumer response to the *White Paper Food AI: A game changer for Australia's food and beverage sector*. While I am comfortable with Food AI being used to enhance food production and quality, reduce waste and create sustainable products I have some questions about the development of Food AIs I have argued for the inclusion of consumers at all stages of AI development. I have suggested that data sovereignty be addressed in AI development, particularly in Indigenous communities. I have said that the development of AIs should look at ways to address the inequities in the AI Divide between those who are comfortable in using digital tools and can access them easily and those who are not. I have cautioned against the potential impact of highly personalised food choices and delivery systems on commensal dining.

⁵⁰ Ko, R., et al p.74

Appendix 1. Proposed mandatory guardrails for high-risk AI at a glance. September 2024

Organisations developing or deploying high-risk AI systems are required to:

1. Establish, implement and publish an accountability process including governance, internal capability and a strategy for regulatory compliance
2. Establish and implement a risk management process to identify and mitigate risks
3. Protect AI systems, and implement data governance measures to manage data quality and provenance
4. Test AI models and systems to evaluate model performance and monitor the system once deployed
5. Enable human control or intervention in an AI system to achieve meaningful human oversight
6. Inform end-users regarding AI-enabled decisions, interactions with AI and AI-generated content
7. Establish processes for people impacted by AI systems to challenge use or outcomes
8. Be transparent with other organisations across the AI supply chain about data, models and systems to help them effectively address risks
9. Keep and maintain records to allow third parties to assess compliance with guardrails
10. Undertake conformity assessments to demonstrate and certify compliance with the guardrails

Appendix 2. Proposed principles:

In designating an AI system as high-risk due to its use, regard must be given to:

- a. The risk of adverse impacts to an individual's rights recognised in Australian human rights law without justification, in addition to Australia's international human rights law obligations
- b. The risk of adverse impacts to an individual's physical or mental health or safety
- c. The risk of adverse legal effects, defamation or similarly significant effects on an individual
- d. The risk of adverse impacts to groups of individuals or collective rights of cultural groups
- e. The risk of adverse impacts to the broader Australian economy, society, environment and rule of law
- f. The severity and extent of those adverse impacts outlined in principles (a) to (e) above.

Appendix 3. Consumers experiences of robot service

These comments are from friends from a similar background to me as described at the beginning. I asked them:

- Have you used a tablet at the table to order food in a restaurant. What did you have to do and how was the experience of doing it? How personalized were you able to make your order e.g. vegan or gluten intolerant.
- If you have been served via a robot what was that experience like?
- Have you used a QR code at the table to order food and what was that experience like? Do you know what personal data was collected during the process if any? How personalized were you able to make your order e.g. vegan or gluten intolerant etc.

I've never dealt with a robot in an eatery and can't actually imagine it - are they like daleks that whizz along the floor? I've ordered via QR and tablet several times, both here and in Spain earlier this year. This is usually in high turnover places, e.g. in the city. The menu itself usually sets out all the options but there's always a fallback waiter. Sometimes, annoyingly, it's run by a third-party app and you have to do the whole details and password thing - annoying. I usually just do it, but I guess I should think more carefully at some point.

I've used apps to order just a few times, and I really dislike them. Unlock your phone, jiggle around in the QR code - inevitably, someone at the table won't know how to do that - then everyone at the table buries their head in a phone. True, everyone normally has to read a paper menu, but that doesn't seem to halt conversation in the way an app does. I value the additional information a waiter can give such as details of ingredients and method of cooking or serving - Is this dish suitable for sharing? How many zucchini flowers are there in the entree size? Are there any additional specials? Only one restaurant I go to has a robot, East Phoenix in Zetland. The robot was used at first to guide people to their table in busy yum cha services, no problem, and deeply fascinating for kids. I haven't seen the robot used about the last 6 or 8 times I've been there. It stands waiting patiently beside the reception lectern. I'm starting to feel sorry for it!

I've used a tablet/ my own phone to order in a pub garden. It works well for high volume environments where there is little need for specific variation.

The robot made me laugh. I loved it. Especially with the smile on the screen on the front of it. I don't think it served us everything but was just used as a gimmick.

I don't mind using the screens/tablets in Japanese restaurants, they can be fun and it's usually straightforward and a group can engage with it when sharing food. I don't like QR codes or apps where you have to give personal information to order and pay. Maybe OK in a crowded pub to avoid queues, and where you don't have to give personal info. Otherwise, I like having a paper menu and someone to take my order as part of the restaurant experience. I have also waited ages for a meal ordered on an app that never arrived due to 'technical issues' - so annoying. In Paris now and the menus and staff are so much part of the wonderful dining experience.

I haven't had the experience of a robot in a restaurant. I have used tablets to order a number of times (most recently in Thai Pothong) which I find ok, but the experience and ability to customise the order depends on how well laid out it is. I like using QR codes to order but the experience is variable and depends on how well laid out the web pages are. I have given up trying to order online via QR code twice because the site was not clearly laid out and/ it crashed. I think that in a busy pub, for example, ordering online (food and drinks) via a QR code saves time over queuing up and ordering.

Only done the table QR thing once & hated it. Seems you can't do anything online these days without having to download an app & set up (yet another) password account. Luckily not many Lismore places have it (yet) & I avoid the ones that do if I can. Seems like another way to cut staff to me. No thanks, give me good old human contact please.

The robots I've seen so far are primarily there to save on human labour. E.G. Bringing primarily tea or sometimes dishes to the table in a busy Chinese restaurant. The same restaurant has a QR code menu that does not require an account or input of any personal details or setting up a personal username or password. The password is provided at the table. If the QR code doesn't work a waiter gives us a tablet, and it's like ordering takeaway online. It was pretty straight forward, and at no stage was I required to give my name or any other personal details. The problem is that such technology is dependent on telephone or wifi reception in the table, if either is low quality ordering can be near impossible.

In Hong Kong they gave up using robots as waiters. Customers kept taking other tables' orders. Now they are just used for taking tubs of dirty dishes into the kitchen

As an information system for bringing food to tables and tabulating orders for payment a QR system should not require any personal information e.g., emails(addresses) or names. Such fields should be generated in the restaurant's system rather than by the customer. There really needs to be some regulations for this in the Privacy Act.