How to Design Organizations to Systemically Integrate AI for Competitive Advantage

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Traditional AI technology and machine learning devices have been shaping the future of business for some time now. However, with the recent arrival of the phenomenally successful generative AI technology, such as Open AI's ChatGPT, which has made this technology available to millions of users, the implications for business and society are profound.

In this rapidly evolving AI environment, Boards and company executives will now have to consider what it means for their organizations to remain competitive.

This discussion paper proposes that '**To realize the full potential of AI technology it must be democratized. That is, it should be accessible to all employees to enhance decision-making, innovation, and customer value. This can only be achieved safely and effectively when workplaces are also democratized.'**

Drawing from my 30 years of experience in designing organizational structures to enhance employee intrinsic motivation and business performance, this paper presents a strategic roadmap for the systemic integration of AI to gain a competitive edge.

The approach I recommend centre on two methodologies translated from Open Systems Theory (OST), namely the Search Conference (SC) and Participative Design Workshop (PDW). These methods are key to establishing democratic team-based structures and are collectively referred to as the OST two-stage model.

Contrary to the conventional use of the PDW in forming democratic structures, I propose a slightly modified version of it. This adaptation is designed to identify opportunities for human-centred AI (HCAI) that can augment jobs and boost business performance. The central modification involves a participative socio-technical systems (STS) analysis, aimed at pinpointing critical decision-making junctures within essential workflows.

At its core, my approach is based on action research (AR). It represents a level of AR that not only seeks to improve practical affairs within a specific organization, but also contributes to the broader field of OST/STS knowledge. This implies that the insights gained from this type of research can be generalized and applied to other organizations aiming for systemic AI integration.

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The future of business being shaped by AI

In 2017, I had the opportunity to explore AI/ML technology developed by Professor Marimuthu Palaniswami (Palani) from the University of Melbourne's Sensor Lab. One of the intriguing devices I encountered was an IoT wearable watch prototype, designed by Palani for stroke patients admitted to a prominent Melbourne teaching hospital.

This sensor watch was capable of measuring vital health parameters such as heart rate variability, activity, oxygen saturation, skin conductance, body temperature, and blood pressure. The wearable transmitted these raw and processed sensor data to a cloud server. Here, signal processing algorithms analysed the data to provide health metrics and suggestions for patient improvement.

Fast forward to today, this prototype has evolved into a smart wearable sensor watch that supports critical care and rehabilitation patients. More information about this IoT wearable watch can be found at Eoxys.ai.

In 2018, I collaborated with Dr. Merrelyn Emery on a Participative Design Workshop (PDW) project. Our goal was to transform a national disability care organization into a democratic team-based structure. A crucial step in the PDWs planned for the disability care client involved mapping the key technical processes for delivering disability care.

During the technical process analysis, my knowledge of AI/ML devices like the sensor watch enabled me to identify several 'low-hanging fruit' opportunities where AI technology could enhance client care and wellbeing, as well as improve the jobs of disability care workers.

When I shared this insight with several PDW participants, I faced significant resistance. The common response was, "we don't need this technology around here – we talk directly to our clients." Others feared that it would lead to job losses.

In response to this pushback, I visited Palani between PDWs. We agreed that demonstrating the sensor watch could help employees understand the benefits of AI technology. One of Palani's PhD students trained me on using the sensor watch for proof-of-concept purposes. In the subsequent days, I demonstrated it to the PDW disability care workers, showcasing how intelligent sensors could significantly improve client monitoring and overall wellbeing as well as their jobs.

The demonstration was successful. The workers realized that AI devices could enhance their jobs rather than eliminate them.

This experience served as a valuable lesson for me on how AI can be seamlessly integrated into an organization without inciting undue fear of job losses. The narrative for incorporating AI into an organization should focus on enhancing the employee work experience by leveraging AI to augment their jobs.

Traditional single function machine learning AI technology has been revolutionizing the business world for a while now, with devices like sensor watches and other machine learning gadgets leading the charge. But the game has truly changed with the introduction of generative AI technology. A prime example is Open AI's ChatGPT, which has brought this advanced tech to the fingertips of millions of users. The impact this could have on businesses and society as a whole is truly profound.

According to a February 2023 report by Swiss banking giant UBS, ChatGPT may have become the fastest-growing app in history after it was estimated to have reached 100 million monthly active users by the end of January 2023.

In this rapidly evolving AI environment, Boards, CEOs, and executive management will now have to consider what it means for their organizations to remain competitive.

Australian banks are currently developing their own generative AI technology to find efficiencies across their operations. The ANZ bank has built a new chatbot powered by generative AI called Z-GPT. It uses huge proprietary data sets to better understand detailed information specific to its customers and the bank.

Leading law firm Allens has also decided to build its own version ChatGPT so staff can explore its capabilities and experience first-hand its limitations. It built its own version because the public version of ChatGPT doesn't have the firm's required level of enterprise-security. It also wants to use its legal data and documents to test the full potential of this emerging technology.

Businesses such as banks and legal firms realise that their data has become a valuable commodity and generative AI is revolutionising the way it can be exploited for competitive advantage. It can identify and analyse patterns across massive data sets to improve decision-making or generate new content including text, photos, and video that is precise, human-like, and seemingly meaningful.

AI's impact on jobs

Large language models (LLMs) like Microsoft's Copilot GPT-4 and Open AI's ChatGPT are examples of AI technologies that are expected to have a significant impact on the job market. There is no shortage of media reports and business articles claiming that generative AI will automate tasks that would otherwise require human intervention.

In an article titled 'Artificial intelligence: Top three roles under threat in small Australian businesses', it found that one third of Australian small businesses plan to replace staff with artificial intelligence. Of the small businesses already using AI, the three top functions the technology is being used for is creative writing (28 per cent), administration tasks (39 per cent) and drafting internal or company communications (20 per cent). Further details about this survey conducted by business consultancy Peninsula Group can be found in the section on articles referenced.

According to McKinsey, *"The accelerated development of generative AI, with its advanced natural language capabilities, has extended the possibilities for automation to a much wider set of occupations. 'Generative' refers to the fact that these tools can identify patterns across enormous sets of data and generate new content—an ability that has often been considered uniquely human.*

Although generative AI is still in the early stages, the potential applications for businesses are significant and wide-ranging. Generative AI can be used to write code, design products, create marketing content and strategies, streamline operations, analyze legal documents, provide customer service via chatbots, and even accelerate scientific discovery. It can be used on its own or with 'humans in the loop'; the latter is more likely at present, given its current level of maturity.

All of this means that automation is about to affect a wider set of work activities involving expertise, interaction with people, and creativity." (Generative AI and the future of work in America McKinsey 26 July 2023)

With the rise of LLMs and other AI technologies the World Economic Forum predicts that nearly 25% of jobs will be disrupted in the next five years. It is expected to lead to the elimination of some jobs, particularly in administrative roles and traditional security, factory, and commerce roles. However, it is also expected to create new jobs in sectors such as education, agriculture, and health. Overall, the impact of technology on jobs is expected to be a net positive over the next five years.

Several specific examples of how AI can disrupt jobs can be found in a Deloitte article titled 'How artificial intelligence (AI) can be harnessed to make an impact across industry'. They include: -

- AI is enhancing the analytic capabilities and insights gained from organizational processes, enabling increased efficiency and mitigated risk.
- Predictive AI is being used to engage with customers more thoroughly and effectively throughout their entire lifecycle, from personalising marketing campaigns and promotions, to recommending individualised next best actions and plans.
- Machine learning models can accurately assess risk with less information, creating an opportunity to simplify insurance applications and remove invasive tests and questions, making the entire process much more user-friendly.
- AI can analyse complex trading patterns in real time and provide information to financial institutions that statistical models cannot, such as the top stocks for the day.
- AI can track banking patterns and alert customers when there is unusual activity, including anything from the devices they use for online banking to the way they use their mouse on the website. This enables the customer to take further action in real time if they suspect accounts have been compromised.
- By analysing structured and unstructured data, AI can provide an analysis of customer data to prompt loan decisions and the creditworthiness of individuals who do not yet have a credit history.
- Using computer vision and other advanced AI technologies, geographic images from drones can be analysed to inform sophisticated valuation models for properties and neighbourhoods.
- AI technologies can analyse the patterns of individual machines to determine its actual maintenance needs and create a customised schedule that minimises overall downtime on a factory floor.
- AI can identify patterns in sensor data to identify which machine parts are most likely to fail. These results can be further analysed to understand the correlation between critical parts' performance and the quality of product output.
- AI can help address skills shortages in industry by augmenting the workforce allowing humans to focus on uniquely human activities, whilst AI takes care of repetitive, low-value tasks.
- AI can detect when items in production lines are damaged. These damaged items can then be automatically removed from the production line and then categorised on their suitability for recycling.
- AI can enable dramatic improvements in key supply chain areas, including demand forecasting, risk planning, supplier management, customer management, logistics, and warehousing, improving operating efficiency and capital management.
- By leveraging digital twin technologies, AI can optimise and predict a transport systems utilisation, minimising congestion and reducing carbon emissions.
- AI can track individual electricity demand and make recommendations for consumers to recharge items, such as electric vehicles, at optimal times.
- AI capabilities can be applied to complex industrial activities. AI can augment a human operator's capabilities, helping them make better decisions and avoid human error.
- AI technologies can identify dangerous working conditions and provide workers with automated alerts to avoid incidents.

This is not a comprehensive list, but it shows how widespread AI technology is being adopted across industry. And AI technology is continually being updated and improved. Already AI technologists are working on AI 'memory' of individual experiences, so user online activity and query responses become personalised.

Consider how companies like Google and Shopify are leveraging generative AI technology to enhance customer personalized shopping experiences. Google's virtual try-on feature uses generative AI to display clothing on various body types and has a feature that finds similar clothing pieces across the web. Shopify uses generative AI to help merchants create better product content and provide personalized recommendations.

And currently Mercedes-Benz is harnessing the power of ChatGPT to deliver bespoke customer experiences. This concept was discussed in a McKinsey podcast titled, 'Gen AI in high gear: Mercedes-Benz taps into the potential of ChatGPT'. Some of the discussion included: -

Imagine stepping onto a showroom floor and having a virtual copilot listen to your conversation with the salesperson, guiding both parties towards a highly personalized experience that caters to your specific needs as a consumer.

Now, consider the implications for marketers. In the past, advertising involved taking a camera crew and several Mercedes vehicles out to Death Valley for a photoshoot. Today, generative AI can create that advertisement and place any individual in the car. This means marketing campaigns can be tailored to individual consumers, reflecting their unique preferences and experiences.

Such advancements will have profound implications for businesses and their ecosystems. For instance, as we shift towards personalized user experiences, manufacturing businesses could be significantly affected, potentially leading to a transition from mass production to mass customization.

AI risks and challenges

As AI continues to evolve, its impact on our lives will become even more pronounced. AI-driven automation, data analysis, personalised recommendations, and other applications will become more prevalent. This evolution presents both opportunities and challenges. Opportunities for innovation, increased efficiency, and improved customer experiences; and risks and challenges that relate to ethics, privacy, the loss of certain jobs, and potential increase in mental health outcomes.

In an August 18, 2023, Conversation article titled, 'Snapchat's "creepy" AI blunder reminds us that chatbots aren't people. But as the lines blur, the risks grow', it revealed that: -

"Generative AI tools, including AI image generators and chatbots, are built on large language models (LLMs). These computational models analyse the associations between billions of words, sentences, and paragraphs to predict what ought to come next in a given text. As OpenAI co-founder Ilya Sutskever puts it, an LLM is:

"[…] just a really, really good next-word predictor."

OpenAI's ChatGPT is still the flagship generative AI model. It's a human-like chatbot that talks to a user rather than at them and has been linked with higher levels of engagement.

Google is using generative AI to build a "personal life coach" that will supposedly help people with various personal and professional tasks, including providing life advice and answering intimate questions.

This is despite Google's own AI safety experts warning that users could grow too dependent on AI and may experience "diminished health and wellbeing" and a "loss of agency" if they take life advice from it.

Either way, the speed with which some users assumed the chatbot had achieved sentience suggests we are seeing an unprecedented anthropomorphism of AI. It's compounded by a lack of transparency from developers, and a lack of basic understanding among the public.

We shouldn't underestimate how individuals may be misled by the apparent authenticity of human-like chatbots.

Earlier this year, a Belgian man's suicide was attributed to conversations he'd had with a chatbot about climate inaction and the planet's future. In another example, a chatbot named Tessa was found to be offering harmful advice to people through an eating disorder helpline.

Chatbots may be particularly harmful to the more vulnerable among us, and especially to those with psychological conditions."

This development is particularly disturbing for those employees who work in dysfunctional inhumane bureaucracies. As our mental health in the workplace research (de Guerre, 2008) identified, these organizations generate low intrinsic motivation, low trust, low intellectual satisfaction, poor mental health outcomes and low productivity.

Our study further substantiated the adverse transfer effects of detrimental mental health outcomes, originating from oppressive workplaces and permeating into the community. A considerable number of employees resort to self-medication, involving both legal and illicit substances, or develop addictions to television or digital games as coping mechanisms for psychological trauma endured in these organizations.

The potential risks could be catastrophic if this self-medication evolves into reliance on life advice from humanoid chatbots. This situation could potentially become a latent threat for both the affected employees and their respective organizations.

For instance, boards and executive management may need to take into account transfer effects of psychological injuries when disclosing their Environmental, Social, and Governance (ESG) responsibilities, where ESG is designed to encompass all non-financial risks and opportunities that are integral to a company's daily operations.

Under the 'social' component of ESG, companies are required to disclose their management strategies for issues such as employee development and labour practices.

The importance of ESG is escalating for companies as stakeholders - including investors, regulators, consumers, and employees - are advocating for companies to responsibly manage not just capital, but also natural and social resources. The incorporation of ESG factors into investment decision-making processes is becoming increasingly prevalent, thereby enhancing the significance of ESG from a capital acquisition perspective.

Unfortunately, there are other emerging AI risks that are already having serious consequences for society and if not responsibly managed, could have disastrous implications for organizations.

For instance, in a Conversation article titled, 'How ChatGPT might be able to help the world's poorest and the organizations that work with them' it reported that: -

"We (the authors) are associated with 'Friend in Need India Trust (FIN), a non-governmental organization (NGO) that wages a daily battle against women's lack of empowerment, pollution, and a lack of functioning sanitation.

Sam Altman, ChatGPT's creator, along with other tech leaders in the US are calling for regulation to contain the risks of AI hallucinations, which is when the technology generates false information that could trigger social tensions.

We asked ChatGPT to produce a speech calling to quell a mob bent on carrying out honour killings.

Even today, India remains plagued by communal violence such as honour killings against, for example, couples who marry outside their caste or young women who seek employment outside the village. ChatGPT proved to be a very effective speech writer, producing compelling arguments against these acts.

However, those in favour of maintaining the status quo could also use the chatbot to justify their violent behaviour to the community. This might happen if they were seeking to retain their status within the village, countering any efforts to encourage community members to end the practices. We found that the AI system was just as adept at producing arguments in favour of honour killings.

For the time being, ChatGPT seems like a handy tool for well-intentioned NGOs, but not so much for the ordinary individuals that they assist. Without users having the means to monitor the ethics and truthfulness of ChatGPT's suggestions, AI systems could become dangerous enablers for disinformation and misinformation."

In another article from The Conversation titled, 'AI systems have learned how to deceive humans. What does that mean for our future? September 4, 2023', it reports on very alarming examples of a deceptive AI. For example: -

LLM models have learned to lie to win social deduction games, wherein players compete to "kill" one another and must convince the playing group they're innocent. These AI systems with deceptive capabilities could be misused in numerous ways, including to commit fraud, tamper with elections and generate propaganda. The potential risks are only limited by the imagination and the technical know-how of malicious individuals.

Beyond that, advanced AI systems can autonomously use deception to escape human control, such as by cheating safety tests imposed on them by developers and regulators.

In the future, advanced autonomous AI systems may be prone to manifesting goals unintended by their human programmers.

Throughout history, wealthy actors have used deception to increase their power, such as by lobbying politicians, funding misleading research and finding loopholes in the legal system. Similarly, advanced autonomous AI systems could invest their resources into such time-tested methods to maintain and expand control.

Even humans who are nominally in control of these systems may find themselves systematically deceived and outmanoeuvred.

It is crucial for Boards and CEOs to be cognizant of the risks AI poses to communities and the potential repercussions for their organizations. They should have a comprehensive understanding of how these risks are currently affecting or may affect their organizations, especially given their accountability for the application of both traditional and generative AI within their businesses.

Some of these risks are highlighted in a McKinsey article titled, 'Four essential questions for boards to ask about generative AI.' A summary is as follows: -

Company executives are scrambling to understand and respond to generative AI…This technology is still nascent, but of those who have used it, few doubt its power to disrupt operating models in all industries.

But the technology still poses real risks, leaving companies caught between fear of getting left behind and an equal fear of getting things wrong. The question becomes how to unlock the value of generative AI while also managing its risks.

Board members can equip their C-suite to harness the potential power generative AI by asking the following four broad questions.

1. *How will generative AI affect our industry and company in the short and longer term?*

Forming any sensible generative AI strategy will require an understanding of how the technology might affect an industry and the businesses within it in the short and longer term.

2. *Are we balancing value creation with adequate risk management?*

An assessment of the new frontiers opened by generative AI will rightly make management teams eager to begin innovating and capturing its value. But that eagerness will need to be accompanied by caution, as generative AI, if not well managed, has the potential to destroy value and reputations. It poses the same—and more—risks as traditional AI.

Like traditional AI, generative AI raises privacy concerns and ethical risks, such as the potential to perpetuate bias hidden in training data. And it heightens the risk of a security breach by opening up more areas of attack and new forms of attack. For example, deepfakes simplify the impersonation of company leaders, raising reputation risks. There are also new risks, such as the risk of infringing copyrighted, trademarked, patented, or otherwise legally protected materials by using data collected by a generative AI model.

Generative AI also has a propensity to hallucinate—that is, generate inaccurate information, expressing it in a manner that appears so natural and authoritative that the inaccuracies are difficult to detect. This could prove dangerous not just for companies but for society at large. There is widespread concern that generative AI could stoke misinformation, and some industry experts have said it could be as dangerous to society as pandemics or nuclear war if not properly regulated.

Companies will therefore need to understand the value and the risks of each use case and determine how these align with the company's risk tolerance and other objectives. For example, with regard to sustainability objectives, they might consider generative AI's implications for the environment because it requires substantial computing capacity.

From there, boards need to be satisfied that the company has established legal and regulatory frameworks for the knowable generative AI risks assumed across the company and that AI activities within the company are continually reviewed, measured, and audited. They will also want to ensure mechanisms are in place to continually explore and assess risks and ethical concerns that are not yet well understood or even apparent. How, for example, will companies stand up processes to spot hallucination and mitigate the risk of wrong information eliciting incorrect or even harmful action? How will the technology affect employment? And what of the risks posed by third parties using the technology? A clear-eyed early view on where problems might lie is the key to addressing them.

The bottom line is that AI must always be subject to the effective oversight of those designing and using it. Support for the effort can come from government regulatory frameworks and guidance being developed on how to use and apply generative AI. It will be important for companies to keep abreast of these.

3. *How should we organize for generative AI?*

Many companies took an experimental approach to implementing previous generations of AI technology, with those keenest to explore its possibilities launching pilots in pockets of the organization. But given the speed of developments within generative AI and the risks it raises; companies will need a more coordinated approach. Getting stuck in pilot mode really isn't an option.

4. *Do we have the necessary capabilities?*

To keep pace with generative AI, companies may need to review their organizational capabilities on three fronts.

Technology

The first front is technology. A modern data and tech stack will be the key to success in using generative AI. While foundation models can support a wide range of use cases, many of the most impactful models will be those fed with additional, often proprietary, data. Therefore, companies that have not yet found ways to harmonize and provide ready access to their data will be unable to unlock much of generative AI's potentially transformative power.

Talent

The introduction of generative AI, like any change, also requires a reassessment of the organization's talent. Companies are aware they need to reskill the workforce to compete in a world where data and AI play such a big role, though many are struggling to attract and retain the people they need. With generative AI, the challenge just got harder. Some roles will disappear, others will be radically different, and some will be new. Such changes will likely affect more people in more domains and faster than has been the case with AI to date.

(As a side note, governments and unions are also considering AI reforms to training. Employers may be required to train staff in technology that might displace them. Protecting workers from the effects of AI will be a key component of government regulation. Unions are also pushing for a body to monitor automation.)

Organizational culture

Finally, a company's culture shapes how well it will succeed with generative AI. Companies that struggle with innovation and change will likely struggle to keep pace. It's a big question, but does the company have the learning culture that will be a key to success? And does the company have a shared sense of responsibility and accountability? Without this shared sense, it is more likely to run afoul of the ethical risks associated with the technology."

This comprehensive McKinsey report outlines risks that boards, CEOs, and their organizations could face from generative AI. However, traditional and generative AI technology have demonstrated their importance in areas such as improving innovation and productivity. They are unlikely to go away. So how do we make it work for organizations and the community?

Regulating AI

Clearly the above AI risk scenarios demonstrate that close oversight is needed. The Australian government has established the National AI Centre to develop the nation's AI and digital ecosystem. It aims to coordinate Australia's AI expertise and capabilities for a strong, collaborative, and focused AI ecosystem that benefits all Australians.

The EU has created the world's first comprehensive regulation on AI, the Artificial Intelligence Act, which aims for moderate regulation and education. It assigns each AI system one of four risk levels: minimal, limited, high and unacceptable.

Systems with unacceptable risk are banned, while high-risk systems are subject to special requirements for risk assessment and mitigation. AI systems capable of deception pose immense risks to society and should by default be treated as "high-risk" or "unacceptable risk".

Some argue that this approach will stifle innovation, while others believe that decisions concerning AI should not be in the hands of "unelected tech leaders."

"The current interest in AI regulation is an opportunity to address issues like bias, misuse, and labour exploitation. However, treating AI safety as a technical problem puts power in the wrong place. Instead, rules governing AI systems should be determined by public debate and democratic institutions.

A sociotechnical approach to AI safety shifts power away from a technical monoculture and creates spaces for wider participation to steer our technological future on the basis of equal concern and common humanity". From an editorial piece by professors Seth Lazar and Alondra Nelson titled, 'AI safety on whose terms?' See articles referenced for details.

Designing organizations to realize the full potential of AI and mitigate its risks

The above analysis shows that there are tremendous opportunities from AI for businesses and their employees.

"The latest annual McKinsey Global Survey on the current state of AI confirms the explosive growth of generative AI (gen AI) tools. Less than a year after many of these tools debuted, one-third of our survey respondents say their organizations are using gen AI regularly in at least one business function". From an August 1, 2023, McKinsey article titled 'The state of AI in 2023: Generative AI's breakout year'.

However, the preceding analysis underscores the inherent risks tied to AI, especially generative AI. In the subsequent sections discussing 'the democratization of workplaces and AI', we illustrate how bureaucratic organizations, which are prevalent, tend to exacerbate AI risks rather than alleviate them.

In these organizations it is almost impossible to get good intrinsic motivator or employee engagement scores. Our evidence of measuring these motivators and nearly sixty years of social science research consistently highlights that bureaucratic organizations fail to meet people's basic human needs of work. This lack of motivation shows up as:

- Low cooperation
- Low quality and productivity
- Turnover and absenteeism, and
- Poor mental health

Our analysis of the bureaucratic structure reveals that it fosters competition among colleagues and between employees and their supervisors. In such an environment, self-interest becomes paramount. This self-interest would dominate if employees had access to AI. For instance, employees marginalized in bureaucratic workplaces could face further exclusion through AI-generated misinformation or disinformation.

Furthermore, there is a risk that disgruntled employees could exploit sensitive data from customers, suppliers, or colleagues by inputting it into a generative AI model. This could result in the creation of deepfakes and other malicious content, thereby posing significant reputational risks.

This analysis underscores the necessity for boards and CEOs of bureaucratic organizations to critically assess the risks associated with democratizing AI. A recommended approach for these bureaucracies to eliminate or mitigate AI-related risks could be to either completely prohibit their use or limit AI access, particularly generative AI, to authorized personnel only, with a focus on work automation and general oversight.

The latter approach is already being adopted by organizations, especially those dealing with hybrid working. In an article from The Conversation titled, "Does your employer have to tell if they're spying on you through your work computer?", it states: -

“We find ourselves struggling with ‘productivity paranoia’: a term used to describe managers’ concerns that remote and hybrid workers aren’t doing enough when not under supervision.

As a result, we’re seeing a surge in the use of electronic monitoring and surveillance devices in the workplace. These devices allow managers to “watch over” employees in their absence. This practice raises serious legal and ethical concerns.

In a survey of 20,000 people across 11 countries, Microsoft reported 85% of managers struggled to trust their remote-working employees. In Australia, this figure was 90%.

In 2021, American research and consulting firm Gartner estimated the number of large firms tracking, monitoring and surveilling their workers had doubled to 60% since the start of the pandemic.

Electronic monitoring and surveillance technology can capture screenshots of an employee’s computer, record their keystrokes and mouse movements, and even activate their webcam or microphones.

On one hand, these “bossware” tools can be used to capture employee and production statistics, providing businesses with useful evidence-based analytics.

The other side is much darker. These devices are indiscriminate. If you’re working from home they can pick up audio and visual images of your private life.

Managers can be sent notifications when data “indicate” an employee is taking breaks or getting distracted.”

When a board and its executives contemplate the democratization of AI, it could be a perilous move if their organization is bureaucratic characterized by low intrinsic motivation, and the deployment of digital monitoring and surveillance technology is already in place. This is a culture that stands in stark contrast to the principles of democratization.

In such a bureaucratic organization, any potential advantages from AI implementation would likely be suppressed, possibly amplifying its inherent risks.

Given that generative AI technology is designed to analyze proprietary data across the entire organization and occasionally across the entire ecosystem, providing AI insights to frontline employees in bureaucratic structures, who often have single-task jobs, may not yield benefits. These employees may lack the motivation to act on organization-wide AI information if it's not relevant to their roles and they don't share collective team goals.

On the other hand, if businesses aspire for their employees to make more informed decisions to boost innovation and customer value, it will require both the democratization of AI and the workplace.

The rest of this paper outlines the steps to achieve these two outcomes. Phase 1 outlines how to democratize workplaces, while phase 2 recommends a process for democratizing AI.

Phase 1: A proven and practical approach for democratizing workplaces

Prior to democratizing AI for all employees, an organization must foster a culture characterized by high levels of cooperation, shared responsibility, and accountability towards achieving team and business objectives. The aim of democratizing the workplace is to cultivate such a culture.

To actualize both workplace and AI democratization, the board and executive management should initially establish a small AI specialist team. This team, equipped with the necessary knowledge and skills, would be tasked with democratizing both the workplace and AI. Their responsibilities would encompass overseeing all AI activities and the process of workplace democratization. This team could be potentially named the 'Democratization of Workplace and AI' or 'DWAI' for short. Further in this paper, we will delve into the proposed responsibilities of the DWAI and discuss the distinction between multi-skilled and specialist teams.

The foundation skill and knowledge to democratize a workplace is provided by a social science body of knowledge know as Open Systems theory (OST). It is a proven and practical theory that provides the steps to establish a democratized team-based organization. These steps are summarized below.

Organizational Design Principles

An often overlooked but crucial method to mitigate AI risk, enhance user safety, and unlock the full potential of AI is through effective organizational design. To understand how to achieve these outcomes, it's essential to revisit the fundamentals of organizational design.

In 1967, while working at the Tavistock Institute in London, Australian social scientist Professor Fred Emery unveiled his discovery of two genotypical organizational design principles. His research was focused on finding an alternative to the bureaucratic structure, known for demotivating employees and leading to substandard work practices. These practices often resulted in poor quality and safety, bullying, clique formation, absenteeism, and a silo mentality.

The discovery of these organizational design principles is centred on how organizations build in redundancy to manage varying demands from their external environments. One approach is to have surplus parts or people, known as the 'redundancy of parts' model or the bureaucratic structure, formally referred to as Design Principle 1 (DP1). The alternative approach is to equip employees with additional knowledge and skills. This is known as the 'redundancy of functions' model or the democratic team-based structure, also known as Design Principle 2 (DP2).

The other important phenomenon occurring during this period was the recognition by Fred Emery and his Tavistock colleague, Eric Trist, that the nature of the external environment was profoundly changing. It had begun to change from a stable to an unstable social field.

One key factor that produced this change was the explosion of thermonuclear bombs by the USSR and the USA. After these apocalyptic events, people started to realize that the nation-state could no longer look after them. They had to fend for themselves. Consequently, people started changing their minds about what they believed in; they were changing their beliefs and expectations, which led to people making different decisions about what products and services they would buy, and how they'd buy them. It produced a highly uncertain external environment or extended social field that is still with us today.

Fred described this environment as trying to move forward while the ground was shifting beneath your feet. It led him to develop and pioneer a new social science body of knowledge known as Open Systems Theory (OST). The central hypothesis of OST is that to remain viable and prosper in uncertain environments, organizations must have an open and active adaptive relationship with their environments over time.

Fred continued researching and improving OST until his death in 1997. Today, Dr Merrelyn Emery continues OST research and development. She is making available Fred's and her unpublished papers and several non-copyrighted published papers at www.socialsciencethatactuallyworks.com.

To further understand OST and the concept of DP1 and DP2, we first must consider an organization as an open system.

Organizations as Open Systems

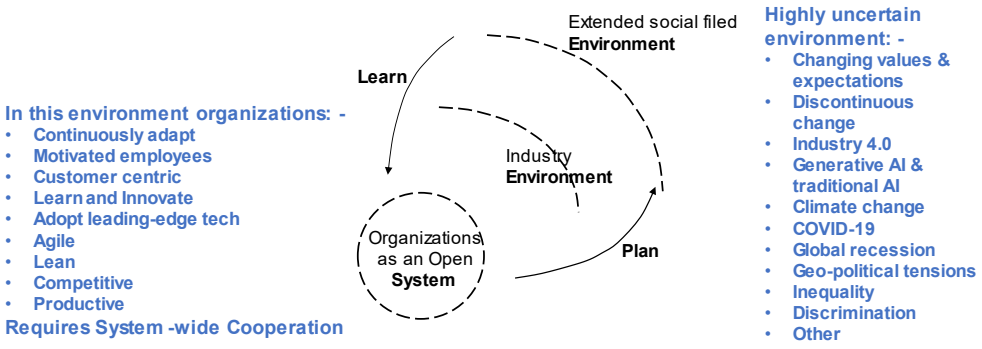
The uncertain external environment that emerged in the 1950s and 1960s is a phenomenon that still persists, but now this uncertainty is being amplified by technology such as AI. Some of the other social vectors and trends adding to this uncertainty are highlighted on the RHS of the following 'Organizations as open systems' diagram.

This very challenging and uncertain environment makes it difficult for businesses to remain viable. To do so, boards and CEOs often remark that we must make fundamental changes to survive. They use adjectives like adaptability, agility, trust, innovation, learning, and other attributes as listed on the LHS of 'Organizations as open systems' diagram. These cultural traits and others like them highlight that all organizations are open, not closed systems – they are open to the changes taking place in their environments.

The diagram also shows that as organizations conduct their business (execute plans), they influence and change their external environments, while at the same time being influenced by external changes (scan & learn) in their social and industry environments.

In high levels of uncertainty, organizations must continually scan & learn about their environments and develop 'active adaptive strategic plans.' That is, plans must be able to adapt to rapidly changing environments, as well as actively influence their environments for a more desirable future.

To execute 'active adaptive strategic plans', organizations must be designed for continuous adaption, which requires a culture of system-wide cooperation and a shared sense of responsibility and accountability to meet team and business goals.



There are two key methodologies translated from OST to help organizations remain viable and prosper in highly uncertain environments. They are the Search Conference (SC) and the Participative Design Workshop (PDW).

The SC is a proven strategic planning process for organisations and communities operating in turbulent and uncertain environments. It is a participative strategic planning process developed by the late Fred Emery. Since its development, Fred and Merrelyn Emery conducted further in-depth action research to improve the effectiveness of the SC.

Today the SC is a proven process for reliable and effective strategic planning that can be used by any organization, community, national or international group to address their future or the future of an issue such as Australia's marginal lands. It has the power to produce cohesive, cooperative management and community groups who become, and stay committed to making their futures. By partaking in a SC, participants are not only committed to making their own futures, but they also learn about the SC process itself so that they can continue to adaptively change.

For organizations attempting to adapt to highly unpredictable environments caused by unstable value systems and amplified by factors such as the accelerating uptake of digital platform and AI technologies, requires an organizational structure that enables a business to quickly adapt and rapidly respond to potential opportunities or threats. Only cooperative workplaces have this inherent capability.

The first step in creating a system-wide cooperative workplace is to ensure organizations are meeting people's basic human needs of work. To do so, we measure the Intrinsic Motivators.

The Intrinsic Motivators

The PDW provides management and employees with the tools and concepts to redesign their organizational structure to improve cooperation and productivity.

The first task in a PDW is to determine the level of employee Intrinsic Motivation. We do this by measuring the 6 basic human needs of work, which are described here and are depicted in the following 'Intrinsic Motivators' diagram.

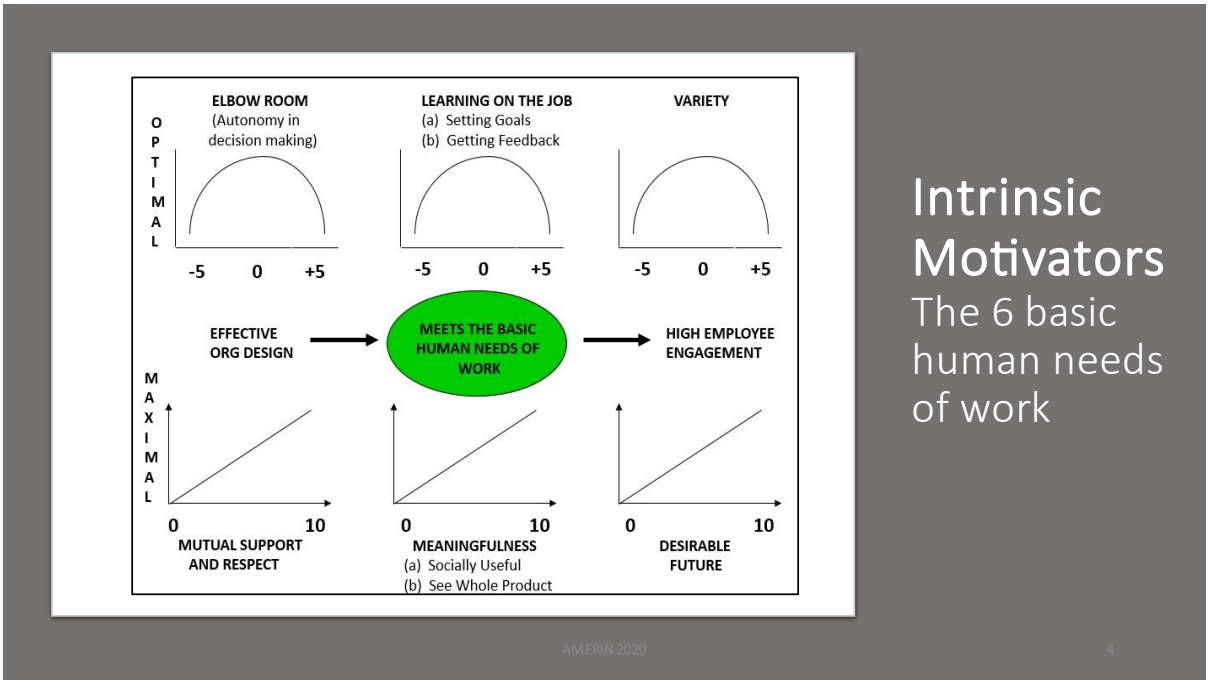
Personal needs of work (factors that vary from person to person)

1. Elbow Room - autonomy in decision making
2. Continual learning, which involves some room to set personal goals or challenges and getting accurate and timely feedback
3. Variety

Workplace climate (factors that people can never have too much of)

4. Mutual support and respect; helping out and being helped out by others without request. A crucial feature when designing DP2 self-managing groups is that it only supports *cooperative efforts*, not *competitive work goals*. MS&R is an accurate measure of cooperation and teamwork.
5. Meaningfulness, which consists of doing something that our society values, and being able to see your contribution to a whole product or service
6. A desirable future, not having a dead-end job

These basic human needs of work must be present if people are to engage in productive work and establish a system-wide cooperative workplace.



As mentioned earlier, our evidence of measuring the Intrinsic Motivators and nearly sixty years of social science research consistently highlights that most organizations fail to meet people's basic needs of work.

And in today's hyper uncertain environment, where change is happening in real time, ALL employees must be motivated to ensure businesses remains viable.

To understand why organizations fail to provide Intrinsic Motivation, we need to further investigate the genotypical organizational design principles.

Design Principle 1

DP1 produces the bureaucratic structure or bureaucracy. Most organizations are designed this way.

Two key features of DP1 are:

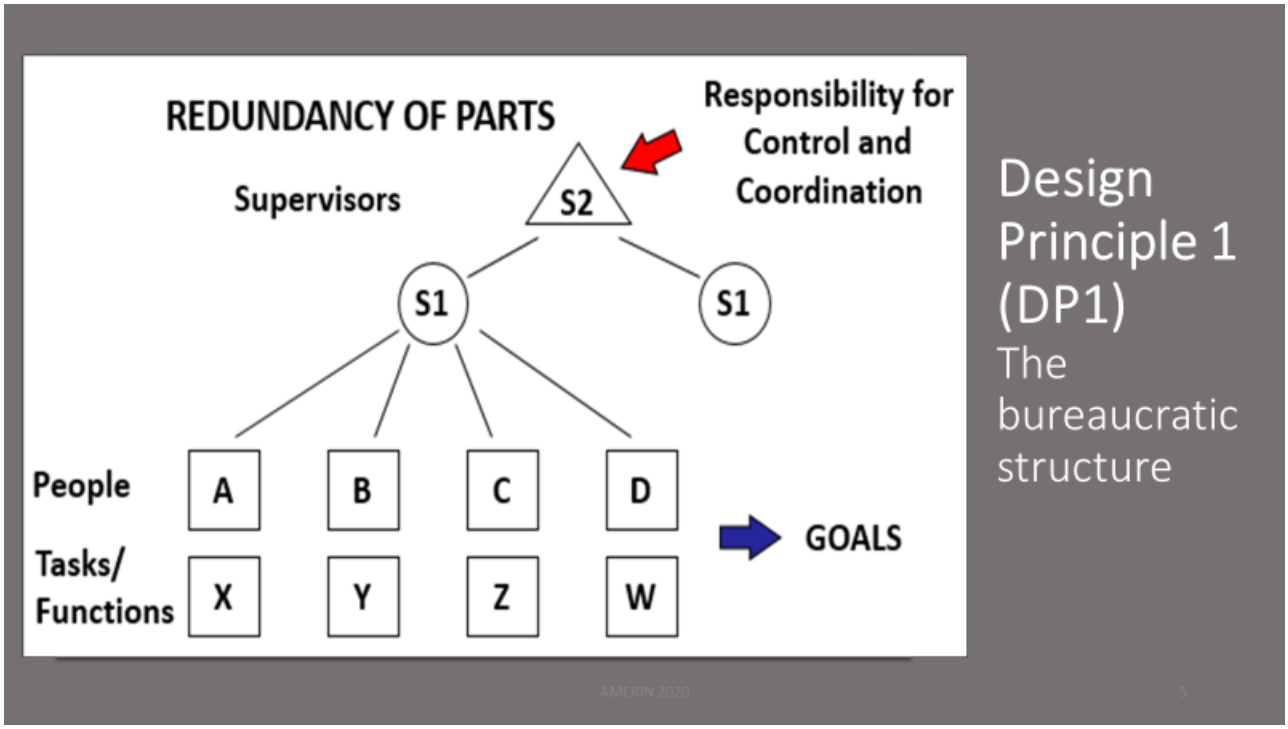
1. DP1 is a redundancy of parts model and
2. Control & coordination of work lies at least one level where the works being done.

As the following diagram shows, a key feature of DP1 is redundancy of parts. This simply means that whole tasks such as assembling a product, are broken down into narrow discrete jobs with minimal requirements for knowledge, skill and, therefore, training.

By making jobs narrow and breaking them down into the minimum number of skills, management can easily replace employees when they leave the organization. Also, the fewer skills required in a job means that training is minimised and the less the boss must pay for labour.

The redundancy of parts model enables DP1 organizations to behave flexibly because there are more parts (jobs/people) in the system than is required. When one "part" fails, another takes over. These parts are like replaceable cogs in a machine.

Today, many of these low skilled jobs are performed by casuals or contractors. It has resulted in the casualization of the workforce and the emergence of the gig economy, which creates risks for organizations, economies, and community members. The COVID-19 pandemic exposed societies around the world to health and economic risks as casual workers, who became infected from community transmission, continued to go to work while sick because of their insecure jobs.



To control and coordinate permanent employees with narrow jobs that have minimum skills requires maximum specifications through tightly controlled job descriptions. Highly specified jobs make life difficult for the supervisor when he/she tries to coordinate people to improve productivity. People say: "That's not in my job description".

For example, if a production operator's (1st part) machine breakdowns, he/she would notify their supervisor (2nd part). The production supervisor would discuss the problem with relevant maintenance supervisor (3rd part) and this person would tell a fitter/electrician (4th part) to go fix the problem, if they have time.

The redundancy of parts model is actually a de-skilling model where people start to lose skills or are not permitted to use any technical or social skills they could have offered to their employer.

The basic building block of the DP1 bureaucratic structure is an immediate boss with several people reporting upwards to him or her. But each boss has another boss above them all the way to the top producing the Command-and-Control structure we are all familiar with.

In this structure the boss has the right and responsibility to control what must be done, what standards have to be met, and the specific objectives each employee must achieve. The boss also coordinates the work to be done in his or her section. That is, the boss determines who will work with whom to ensure the section's goals are met. In this DP1 diagram S1 is responsible for meeting the section goals.

Thus, the *critical feature* of a DP1 bureaucratic structure is that responsibility for control and coordination is located at least one level above where the work is being done.

The right and responsibility of the boss to tell subordinates what to do and how to do it is defines the relationship as one of personal dominance, master-servant. *Superior and subordinates have by definition unequal status.*

This pattern of personal dominance, controlling and coordinating subordinates' work and managing, monitoring, and resourcing the one-to-one relationships is repeated from the bottom to the top of an organization. It results in a dominant hierarchy of authority. It has been the main way organizations have been designed since the start of the industrial revolution over 200 years ago, when external environments were much more stable than today.

Analysis of the DP1 model highlights the fact that it induces internal *competition*, not *cooperation*, because "A", "B", "C" and "D" are competing for "S1" position. In this hierarchy there is only one position for promotion.

The critical impact of this internal competition is 'communication'. It is not in people's interest to communicate to each other about work because collectively they don't own 'the goals'.

The internal competition is not only across workplace levels (between "A" and "B", etc), but also between levels (between "S1" and "A", "B", "C" and "D"). Therefore, communication is poor - both horizontally and vertically, in a DP1 structure.

Poor communication from induced competition results in error amplification. As Fred Emery identified in his 1977 book titled 'Futures We're In', "It is not in an employee's interest to pass up the chain of command any errors that the business should address and learn from but could make an individual appear as a failure in the eyes of a superior."

The nature of the DP1 structure ensures that it is almost impossible to get good scores on the 6 criteria, the intrinsic motivators.

Elbow room, autonomy for decision making: if the boss is doing their job properly and making all the decisions about how and when work should be done, there are virtually no decisions left for the subordinates to make. They are supposed to just do as they are told.

Continuous learning: again, if the boss is doing their job properly there is little room for people to set goals and, therefore, challenges for themselves. Superiors typically underestimate their subordinates so the goals they set for their underlings are not challenging. And as mentioned above, DP1 induces competition between peers for promotion. Competition therefore destroys the potential for accurate and timely feedback as it is not in a subordinate's interest to correct another's mistake.

Variety: when a person is stuck doing their job X and only X, there is little variety. Boredom is inevitable and we often find over 30% saying they are frequently or constantly bored at work and another 40% who are bored sometimes.

Mutual support and respect: competition affects this factor in the same way as it affects feedback. This is particularly unfortunate for those suffering genuine problems as they are often ignored if not ostracized. There can also be little respect when everyone is trying to be the brightest, the strongest or the boss's favourite.

Meaningfulness: when people have no control over the work they do and no involvement in the direction of the organization more generally, they have no chance to improve the social value of their work. Also, when they are stuck doing X which produces part of a small component, they often do not know what the component is or what it is used in.

Desirable future: there is little opportunity in many DP1 structures to increase skills and knowledge when working in narrow fragmented jobs. And consider the case of skilled tradespeople who get stuck doing just X or Y. What happens to the skills they came in with? The rule is 'use it or lose it'. Bureaucracies are inherently deskilling.

Thousands of intrinsic motivator surveys have been conducted over the last 50 years and in many countries. Time and time again employees, especially frontline employees who have little control over their work, score poorly when they work for DP1 bureaucracies.

Even when management has gone out of its way to improve the hygiene factors or Extrinsic Motivators (such as pay), the Intrinsic Motivator scores remain low. For example, the following Intrinsic Motivator scores are from employees working in a DP1 manufacturing plant that was about to close its doors because it couldn't compete with low-cost imports from China.

Results of a PDW organizational assessment of a small manufacturing plant (N = 68)

Intrinsic Motivators (personal needs of work)

	Variety	Elbow room	Setting goals
Too little	60%	63	65
Just right	30	34	32
Too much	10	3	3

Intrinsic Motivators (work climate)

	Desirable future	Mutual support and respect	See whole product
Below average	57%	41	38
Average	19	24	22
Above average	24	35	40

With poor scores like these, it wasn't in the interests of employees to work together to improve plant productivity. Self-interest was their main priority.

Finally, the above analysis is a reminder that there are significant in-built tangible and intangible costs required to maintain a DP1 organizational structure. They include:

- The structure de-motivates and de-skills employees. This outcome is a main reason why high employee engagement scores in DP1 organizations are only around 30% and why absenteeism and turnover typically remain high. To mitigate these outcomes, costly and unsustainable training programs are rolled out.
- DP1 is a mechanistic model where employees are treated as replaceable parts/cogs in a machine and internal competition for jobs is high. This leads to people looking after their own interests first, not the organization's, which leads to low cooperation and innovation.
- Induced internal competition also leads to poor communication; that is, where people only communicate what's of benefit to them. It results in error amplification that requires costly rules and procedures, and in some instances, costly surveillance systems.
- The DP1 organizational structure produces the group dynamics of dependency (waiting for S1 to give instructions) and fight/flight (actively or passively questioning S1's authority). It leads to time wasting, or worse, costly industrial disputes.
- As mentioned earlier, DP1 is a pattern of personal dominance, controlling and coordinating subordinates' work and managing, monitoring, and resourcing the one-to-one relationships from the bottom to the top of an organization. Managing and monitoring those relationships requires the costly maintenance of ineffective performance appraisal programs.
- Finally, our mental health in the workplace research (de Guerre 2008) clearly shows that DP1 structures generates low intrinsic motivation, low trust, low intellectual satisfaction, poor mental health outcomes and low productivity.

These inherent costs are an unnecessary impediment on performance. They make it quite difficult for some organizations to remain viable as external business environments increasingly become more competitive and unpredictable. It is especially difficult for these organizations to continuously adapt in today's rapidly changing environment where real-time change is the 'new normal'.

This brief analysis shows that DP1 structures, bureaucracies, de-motivate and de-skill employees, which is an unsustainable situation where to remain competitive, employees need access to state-of-the-art technology such as generative AI to continually innovate and improve customer value.

It isn't empty rhetoric to say that employees are our most important resource – organizations really do rely on their people to cooperate to generate innovative ideas and deliver high levels of customer service and productivity. People who are angry, frustrated, bored, and generally turned off do not deliver competitive outcomes. They no longer care about the organization and its goals. And they certainly wouldn't have the interest to use AI to improve performance.

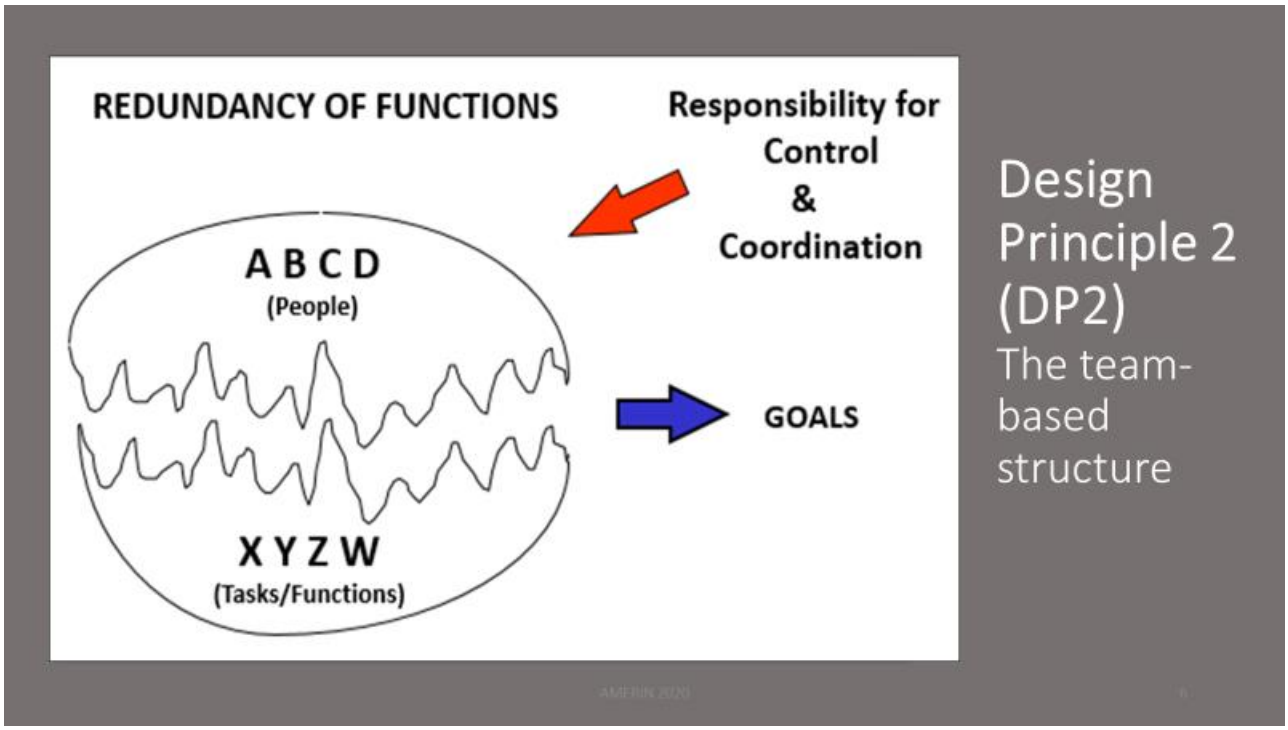
Democratizing AI in a dysfunctional DP1 organization would be a high-risk decision. As discussed earlier, disgruntled employees who have access to an organization's generative AI technology could for example, produce deepfakes of company leaders, leading to reputational risks.

To create a culture where it is in people's interest to cooperate and effectively apply AI technology to help meet business goals requires a change in Design Principle – from DP1 to DP2.

Design Principle 2

A second way of building redundancy into an organization so it can be flexible and adaptive is by adding redundant functions/skills. It is known as the redundancy of functions model and results in the DP2 organizational structure.

In DP2 organizations there is more skill and knowledge built into each part / person than that person can use at any one point in time.



The basic building block of a DP2 organization is a group taking responsibility for its own coordination and control - the self-managing group (SMG), where members are collectively responsible and accountable for meeting agreed goals, including goals associated with the use of AI.

As highlighted in the above DP2 diagram, control and coordination (the two dimensions of human work) of the tasks "X, Y, Z & W" are located with the people "A, B, C & D". The goals of the section's overall performance are now the responsibility of "A, B, C, & D".

"A, B, C & D" determine the best mix of multi-skilling (i.e. - "X", "XY", "XYZ", etc) to efficiently and effectively meet the goals of the group.

In the previous DP1 production breakdown example, we described that were 4 parts (people) with separate job descriptions involved in fixing part 1's broken down machine.

In DP2, a self-managing group of production operators holds all the essential skills, including AI skill and knowledge to keep the production line operating at the output and efficiency rate specified in their agreed goals. Those operators (usually the ones who are keen to move along a maintenance career path) hold sufficient breakdown maintenance skills to help the group meet its production goals.

Whereas DP1 is an autocratic or bureaucratic organization with a master/servant relationship, DP2 is called a democratic organization, with a relationship of *cooperation*.

In terms of the work, a group performs a whole task where the whole task is a complete product or service or a major component of it. In DP2, rather than a boss setting goals for each individual and the section, the group is responsible and accountable for meeting a comprehensive set of measurable goals which they have negotiated and agreed with management.

It's important to note that self-managing groups are not autonomous. They can't do what they like. Along with existing company policies and procedures, an agreed set of goals controls the work of the group. Therefore, it is necessary that there is a goal for each dimension of a group's work, not just production or output goals.

The *critical feature* of DP2 is that responsibility for control and coordination is located with the people doing the work, that is, with the group.

The groups control and coordinate their own work and themselves. This is quite different from DP1, the bureaucracy, where the boss is responsible and accountable for controlling and coordinating the work of subordinates.

When an organization transforms from DP1 to DP2, former supervisors and middle managers generally become part of a self-managing group providing support and training to the operational / frontline groups, or they work on future developments such as projects to reduce the organization's carbon footprint or help introduce the responsible use of AI. And depending on the size of the organization, some middle management groups become a resource for executive management, which involves responsibilities such as communicating updated strategic goals and policies to operational groups, and then renegotiating operational self-managing group goals to align with new strategic goals followed by supporting these groups to meet their goals when required. Whatever their responsibilities, supervisors and middle managers do not get involved in the day-to-day work of operational self-managing groups. They as a group have their own productive work to do.

When an organization transforms from a DP1 to a DP2 organizational structure, former supervisors and middle managers are responsible for designing their work that is meaningful and intrinsically motivating. Today however, many supervisors and middle managers who work in DP1 organizations are not engaged at work, with some suffering psychological injuries from their work. According to

Microsoft Edge, a *13 June 2023 Gallup poll found that managers are more likely than non-managers to be: -*

- *disengaged at work,*
- *burned out,*
- *looking for a new job, and*
- *feeling like their organization does not care about their wellbeing.*

The poll also found that 59% of workers are "quiet quitting" and 18% are "loud quitting".

The poll results suggest that the majority of workers around the world are historically stressed, disengaged with their work, and increasingly fighting with their bosses. Gallup estimated that low engagement is costing the global economy nearly $US 9 trillion.

It's important for organizations to recognize the importance of employee engagement and well-being. Gallup asked employees what would make their jobs better, and the majority of responses — perhaps surprisingly — didn't address pay and benefits (i.e., the Extrinsic Motivators – my comment), but rather issues such as more autonomy, clear goals, and being recognized for their contributions.

In other words, employees want to have jobs that provide Intrinsic Motivation!

The results from this Gallop poll not only have huge implications for the successful implementation of AI, but also for the mental health of many employees including supervisors and middle management. Unfortunately, executive management and organizational change consultants who are unaware of the design principles are still offering change management programs that try to make DP1 better! They roll out superficial programs like: -

- Improved communication,
- More manager training and development, and
- Manager coaching to prevent psychological injury.

As the above analysis of the DP1 structure shows, DP1 structures induce competition between peers resulting a culture of 'self-interest first' to survive. No amount of coaching or training or team building exercises will change the nature of DP1.

And from our 'mental health in the workplace' research (de Guerre 2008), changing the name of a supervisor to 'team leader' makes the bureaucratic situation worse. It creates confusion about who is responsible for business goals and can lead to a laissez-faire organization (i.e., no structure) where a culture of scapegoating and bullying is not uncommon. Our research clearly shows that only DP2 organizational structures will provide meaningful and motivating work for employees.

The basic structural unit of a DP2 organization is the self-managing group and it is repeated from the bottom to the top of the organization. DP2 organizations that consist of self-managing groups at all levels are called non-dominant hierarchies of function.

Relations between groups at whatever level are all conducted as negotiations between peers, equals. This means change can be initiated from any point in any organization.

The structure induces cooperation rather than competition. When people work in groups to meet their group goals, it is in their interests to cooperate and communicate effectively to make the group look as good as possible. No group wants to fail.

Under these conditions, all the problems and inbuilt costs that arise from the competitive behaviours caused by the DP1 bureaucratic structure are not present.

For example, an organization (as an open system) becomes error attenuating because as employees coordinate their work to achieve their group goals, it's in their interest to address and learn from errors as they come into the system. And with the introduction of technology such as ChatGPT, it will become more likely that these errors will quickly be identified by AI analysis of proprietary data.

In 'Futures We're In', (Emery, F. 1977) Fred Emery identified that "Error is coped with by continuous learning and rearrangement of functions." It's not too difficult to imagine that self-managing groups will in the foreseeable future have access AI copilots to enhance their continuous learning to efficiently and effectively meet their group goals. Fred also pointed out that self-managing group members will check with each other as to the quality of advice they give to the next hierarchy of function (e.g., middle management resource groups or executive management) to help diffuse learning/knowledge across the organization to improve performance. Once again, AI copilots will augment this organizational learning for competitive advantage.

Self-managing group members will often need to incorporate external skills / functions into their team. This is necessary when employees don't get enough variety from multi-skilling within say, an operational team. For example, in a production team, employee variety needs are not met by simply training someone to operate machines 1, 2, and 3. The skills are often too similar.

When self-managing group members organise their mutual support to cope with task variation of individual members, they must also share the tasks of monitoring and controlling the contributions of their own members.

In fact, a DP2 structure is more tightly controlled than DP1 because you have the "eyes" of "A, B, C and D" monitoring your performance, rather than just "S1". Each person is responsible to help achieve the goals of the section.

Frontline operational self-managing groups must also build strong links between other groups, support groups and management resource groups. DP2 requires system-wide cooperation if agreed self-managing group goals and targets are to be met.

Employees' basic human needs of work, the intrinsic motivators, improve dramatically when they work in self-managing groups:

Elbow room: all the decisions previously made by the immediate boss are now available to the group. People who like making decisions have many to make. People who prefer to hang back can do so.

Continuous learning: when the group discusses who is to do what, members participate to ensure they get the challenges they need to learn. For example, if a worker does not want to move up a career path and prefers to do simpler jobs then group members can arrange for this to happen. On the other hand, for those who want to take on more challenging tasks that will help meet group goals then the members can plan their work for this outcome too. And as people are now cooperating to achieve their goals, it is in their interests to give each other accurate and timely feedback.

Variety: All the narrow jobs included in the group's task are now available to all members.

In general, self-managing groups work flexibly so their members each get the right amount of decision making, learning and variety.

Mutual support and respect: as the structure produces cooperation, so it also produces mutual support and respect. It is now in everybody's interest to look after and help each other out. In self-managing groups, members are valued for their contribution and are not treated as replaceable cogs in a machine.

Meaningfulness: as people are actively participating to ensure an adaptive direction for the organization, they have opportunities to improve the social value of their work. Group members also understand their contribution to a whole product or service because the self-managing group is responsible for a whole task.

Desirable future: group members can now learn all of the skills and knowledge encompassed in the previously fragmented narrow jobs. In DP2 structures the only way to pay people fairly is to move to a competency-based pay system, which provides career paths that supports personal development and underpins group goal attainment. To advance along competency-based career path, an individual must demonstrate that he/she holds a particular unit of competency – that is, a distinct knowledge set or can apply a particular skill pertaining to a pay level. In this type of remuneration system, employees are not paid for doing a job, but for the knowledge and skill they hold to help their self-managing group meet its goals.

A DP2 organization that creates the conditions for the development of a highly skilled workforce will be in a competitive position to realise value from digital transformations and AI. For example, it will be able to quickly exploit emerging opportunities from AI and Machine Learning (ML) technologies.

DP2 organizations with a competency-based remuneration program in place, have a framework to readily incorporate AI/ML competency-based career paths. This will encourage the development of AI/ML capability and facilitate the attraction of tech-savvy personnel who embrace Industry 4.0 technology.

(As a side note, and according to Bing Chat, *AI platforms are being developed to manage the complexity of competency-based career paths and remuneration programs. These platforms leverage AI's capabilities to efficiently improve internal mobility efforts at scale by managing employee skills and career paths. They also help optimize talent acquisition processes by leveraging AI-driven tools.*)

With respect to performance monitoring, and as mentioned earlier, a self-managing group is responsible and accountable for meeting a negotiated and an agreed set of comprehensive measurable goals.

When agreed goals are in place, each group monitors its own performance as a matter of course so it knows how it is going. It is extremely rare for a group not to have met its goals by the end of the reporting period. If a group realizes it won't meet one of its goals, it automatically analyses why. If different conditions or quality of supplies are required for example, the group will sit down with the relevant support or resource group to discuss their problem to help sort it out. This may involve training, more timely information, new technology or other resources.

The management resource group may be required to monitor the performance of frontline SMGs against their set goals, especially in their formative stages. A crucial responsibility of the management resource group during initial DP2 operation is to ensure that all group goals are aligned to meet the strategic goals.

The above analysis clearly highlights that DP2 democratic businesses will have the cultural traits and a much greater proficiency than DP1 bureaucracies to adapt and respond to a fast-changing AI world and compete with competitors.

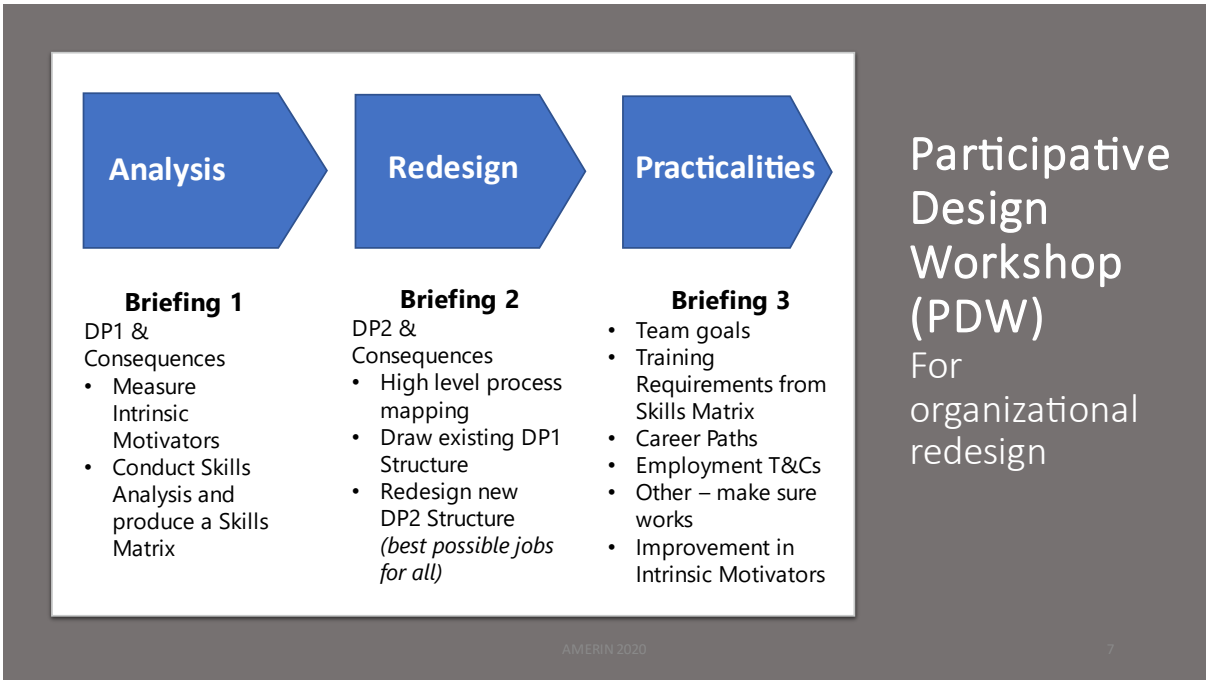
To change from a DP1 to DP2 organizational structure requires undertaking a participative STS analysis using the OST Participative Design Workshop (PDW).

The Participative Design Workshop

In 1971 Professor Fred Emery pioneered the development Participative Design Workshop methodology for changing organizational design principles from a DP1 bureaucracy to a DP2 democratic team-based structure. After further refinement and development, especially by Dr Merrelyn Emery, it is now the most effective and efficient process known today for creating democratic organizational structures in which members have a shared responsibility for meeting agreed goals.

It is a coherent strategy whereby management and employees within an organization are given the concepts and tools to redesign their workplace using democratic principles. By pooling employee knowledge and initiatives for change, they themselves can redesign their workplace.

The three main components of the PDW are summarized in the following diagram: -



Case studies of those organizations that have utilised the PDW to establish DP2 democratic team-based structures show that benefits are translated to the bottom line in a relatively short period of time.

Please note that including detailed OST case studies is outside the scope of this paper. However, in the 'Notes' section I've included several OST testimonials to indicate significant performance improvements by those organizations that have undertaken a SC and / or PDW.

Planning and preparation steps for transitioning to DP2

Organizations that transform from DP1 to DP2 are often facing an urgent and strategic crisis – requiring a "burning platform" of change where maintaining the status quo is not an option. As such, this type of transformation can be particularly challenging for some personnel, especially those who are comfortable in their existing roles and are reluctant to change.

And because changing design principles is equivalent to changing an organization's 'DNA', it is imperative that the board, the CEO, and executive management fully support and are committed to changing their organization's design principles.

To appreciate the change effort involved, consider the following planning and preparation steps for a typical PDW project: -

- Key players must understand the design principles and their consequences for intrinsic motivation, mental health, and productivity.
- Commitment from the CEO, executive management and the board must be explicit. They must have in place plans to deal with those who resist change efforts.
- The transition must be sanctioned from the leadership group. PDWs then commence from frontline / operational level – that is, a bottom-up approach, sanctioned from the top.
- CEO communicates to all employees the company vision, strategic goals and rationale for change.
- It is strongly recommended that an online employee communication channel be established, especially for those organizations that have employees working in different geographical locations.
- Involve and get feedback from ecosystem members – customers, supply chain partners, unions, others.
- Establish and train a PDW transformation team.
- In the current environment, the transformation team will need to know how to:
    - Design work for hybrid workers – remote and/or in-person
    - Suggest ways to eliminate or mitigate errors identified during process mapping. Some could involve the use of smart technology.
    - Scale agile teams or cross-functional teams that may already be in place.
- Design a bottom up PDW project plan for the entire organization.
- Establish a Terms & Conditions (T&C) employment project group to:
    - Develop DP2 terms & conditions of employment.
    - Use PDW skills matrix data to establish a competency-based career path and remuneration program.
    - Develop a redundancy policy because some employees may want to move on, even when redeployment opportunities are provided.
- Seek support from relevant unions and government industrial relations authorities (e.g., the Fair Work Commission in Australia) for building cooperative and productive workplaces.

Other aspects of a DP2 organization that all personnel must be aware of are: -

- The basic unit of work is the self-managing group, a structure that is predicted to yield superior employee intrinsic motivation. But how can we be certain? OST is a bona fide social science theory capable of generating testable predictions. One such prediction is that Design

Principle 1 (DP1) results in subpar intrinsic motivation scores, while Design Principle 2 (DP2) leads to significantly improved scores.

- The number of levels of hierarchy of function in a DP2 organization depends on its size. The levels typically relate to the different number of planning horizons and the knowledge & skill levels associated with these planning levels.
- Not all SMGs consist of multi-skilled members. For instance, during a DP1 to DP2 transformation in a large brewing company, the executive management team was composed of specialists from various divisions such as finance, R&D, production, marketing, HR, procurement, and legal. Each specialist had individual controlling goals, yet they needed to collaborate to achieve their coordination business goals. Occasionally, conflicts arise between coordination and control goals, requiring the SMG to find a resolution. In one case, the production manager had to compromise bottling line efficiencies to fulfill marketing objectives, which ultimately enhanced overall business performance.
- DP2 structures should be formalized via an enterprise agreement between management and employees and / or their union. Informal DP2 structures can easily be dismantled when for instance, a new CEO is appointed.

While there are additional characteristics of the DP2 organization that the board, CEO, executive management, and indeed all employees should be cognizant of, they fall outside the parameters of this paper.

The key insight from the above analysis is that if an organization's intrinsic motivation or employee engagement scores are low, it would be prudent to refrain from democratizing AI. Conversely, if these scores are high, it's likely indicative of a cooperative culture where employees share responsibility and accountability for achieving group goals. These cultural characteristics are essential for the safe and effective democratization of AI.

Phase 2: How to democratize AI for democratized workplaces

While researching this paper, I encountered numerous proposed 'solutions' for democratizing AI. However, based on my experience, these solutions often fall short in two key areas: sustainability and practical implementation. Although they offer ample advice on the prerequisites for democratizing AI, they unfortunately lack concrete methods to achieve this goal.

In one of the articles referenced for this paper titled, 'The Tech Blog by Peter H. Diamandis, MD 2023 Embrace AI or Face Extinction', he states: -

"There is no way for companies to harness this kind of (generative AI) power and creativity without, in some way, democratizing control over AI. Only innovation driven by workers can radically transform work, because only workers can experiment enough on their own tasks to learn how to use AI in transformative ways. And empowering workers is not going to be possible with a top-down solution alone."

He goes on to suggest that Extrinsic Motivators are the answer for democratizing AI: -

"Consider offering radical incentives to ensure that workers are willing to share what they learn…Corporate leaders need to figure out a way to reassure and reward workers, something they are not used to doing."

However, offering employees incentives such as financial rewards are extrinsic motivators. They are external rewards that are given in response to completing a task or achieving a specific goal. While

extrinsic motivators can be effective in encouraging behaviour in the short term, they do not lead to long-term engagement or satisfaction. Intrinsic motivation on the other hand, is when you engage in activity for its own sake rather than from the desire for some external reward.

The democratization of AI will only be successful if we establish conditions where it's in employees' interests to utilize AI to improve innovation, customer value, and productivity. These conditions are created by establishing a DP2 organizational structure, which fosters high levels of intrinsic motivation.

Also, while working on this paper, I noticed a gap in the available information on how to cultivate a culture that democratizes AI. There's ample information describing the type of culture needed, but there's a scarcity of guidance on how to create such a culture.

For instance, Microsoft's 'AI Business School Artificial Intelligence Courses', listed in the 'Articles Referenced' section, teaches how to effectively use AI in business and foster an AI-ready culture. The course underscores the importance of involving everyone in the AI journey and promoting a team-oriented environment. It also refers to an e-book, 'Empowering employees with AI', where Microsoft commits to democratizing AI by making it accessible to all employees, not just tech experts.

In my quest for a deeper understanding of how to cultivate an AI-ready culture, and to comprehend the nature of the culture necessary for safe and responsible AI usage, I found that the process is far from straightforward. My experience with OST methodologies such as SC and PDW has taught me that effecting cultural change goes beyond simply watching a video or reading a manual. It necessitates providing both management and employees with the appropriate tools and techniques to create their own AI-ready culture.

Another key insight that guided my proposed method for AI democratization was my experience of identifying AI opportunities during the technical systems analysis of a disability care PDW project. My familiarity with AI/ML devices allowed me to anticipate how AI could enhance performance and jobs, reinforcing the need for AI training before any transformation project.

This training should include demonstrations of AI devices and applications to alleviate fears about job loss due to AI. For example, when I introduced the smart healthcare watch to disability care workers, the demonstration shifted their perception of the watch from a threat to a tool for job augmentation.

Interestingly, this thinking aligns with the concepts of the Human-Centered AI (HCAI) community introduced to me by my colleagues from the North American STS Roundtable. Led by STSRT President Bert Painter, we have been exploring how the STSRT can collaborate with the HCAI community to integrate AI technology into organizations humanely and responsibly.

After extensive reading about how to make AI available to all employees, I concluded that 'To realize the full potential of AI technology, it must be democratized. That is, it should be accessible to all employees to enhance decision-making, innovation, and customer value. This can only be achieved safely and effectively when workplaces are also democratized'.

Democratization planning and preparation

As previously mentioned, it is advisable for the board and CEO to establish a small AI specialist team that is responsible for overseeing and controlling the democratization of both the workplace and AI. In this paper I refer to this team as the 'Democratization of Workplace and AI' group or the DWAI group.

The primary duty of the DWAI group is to ensure their organization, and potentially its ecosystem, can systematically integrate AI for competitive advantage.

Below is a suggested list of additional responsibilities for the DWAI. This high-level list serves as a guide for the democratization of both the workplace and AI.

Secure commitment from the CEO and board on democratizing the workplace.

Brief the CEO and board on workplace democratization. They should be familiar with the list of planning and preparation items in the above section on how to democratize the workplace. As mentioned, it's critical to get commitment from the leadership group before proceeding.

Establish a core AI advisory group to inform AI democratization.

Set up a cross-functional 'AI Advisory Group' composed of experienced staff from various departments such as data science, engineering, legal, cybersecurity, marketing, design, finance, HR, and other business functions. This team could provide valuable support for numerous AI initiatives. For instance, they could: -

- Advise whether their organization should develop its own generative AI technology or use "off-the-shelf" foundation models such as ChatGPT,
- Participate in a SC to establish strategic goals in an AI world and join action planning SMGs to meet these goals
- Assist in identifying and prioritizing AI use cases, and
- Offer advice on AI training.

In addition, members of the core AI Advisory Group would need to hold the AI skill and knowledge to research and advise the board and executive about potential applications and risks of traditional and generative AI in their industry.

Prior to undertaking a SC and PDW, the DWAI and core AI Advisory Group should formulate questions regarding the utilization and potential benefits of both traditional and generative AI. Here are two to consider:

1. Which AI applications will be most beneficial for their organization and its ecosystem partners?

2. When should generative AI be integrated with traditional AI to maximize potential opportunities and when should they be treated separately? For instance, the foundational models underpinning generative AI could process vast amounts of unstructured manufacturing data, such as shift reports and logbooks, thereby enhancing current traditional AI solutions that optimize performance.

After they have identified potential use cases, they can begin to evaluate which ones are most relevant to their business and which ones would yield rapid returns on investment, while also remaining vigilant for any systemic risks.

As part of this analysis, the AI Advisory Group should be considering the effect use cases could have on employees. Therefore, they need to incorporate HCAI thinking into decisions about their recommended use cases.

This analysis will help inform the AI training too. It should also be considered as an initial step in any proposed PDW project for the democratization of a workplace and AI.

Establish an AI Centre of Excellence (CoE).

Consider this as a central hub for all AI-related matters. It's not intended to be an isolated unit, but rather a nexus that coordinates AI initiatives across the organization and its ecosystem.

The CoE can also coordinate AI training across all DP2 self-managing groups. For example, to meet SMG goals, each group should have at least two members who hold essential AI skill and knowledge. And while developing an AI training program, the CoE should oversee the development an AI competency-based career path and remuneration program. An AI training program and competency-based career path are further discussed below.

The CoE should also develop guiding principles that reflect HCAI values and incorporate them into the AI training program.

AI must always be subject to effective oversight of those designing and using it. Support can come from government regulatory frameworks and guidance being developed on how to use and apply generative AI. It will be important for the DWAI and CoE to keep abreast of these developments.

As part of the CoE AI coordination efforts, the DWAI should hold regular AI meetings with SMG and ecosystem members. Any relevant insights about the safe and responsible use of AI technologies should be referred to the board and executive management, as well as AI regulatory authorities to ensure a safe and competitive future with the technology.

Develop and roll out an AI training and demonstration program

Before undertaking any PDWs, AI training should be made available to ALL employees to show how this technology can augment jobs. If it looks like automation will make some jobs redundant, then policies and programs need to be developed for potential employee retraining or redeployment, as is the case with any PDW.

As a minimum, I recommend that all employees have a basic understanding of AI devices and applications, and their risks. In fact, I believe this training should be a foundation unit of competency.

For those managers and employees participating in a SC and PDWs, they should all have a working knowledge of AI devices and applications relevant to their organization's industry. They should also be aware of AI risks and the safe and responsible use of AI technology.

By having a workforce with a working knowledge of AI, it will help identify AI opportunities and threats when SC participants are developing strategic goals and action plans. PDW participants designing DP2 structures will be able to identify AI improvement opportunities when carrying out workflow analysis.

To make AI training relevant and meaningful, and to help with the adoption of AI, demonstrations should be carried out like the sensor watch demo in the disability care PDW project mentioned earlier. Traditional AI demonstrations that rely on data generated from smart sensors are relatively simple. Generative AI demonstrations can be more problematic because often they need reliable and secure proprietary data.

Generative AI demonstrations or use cases can be done via co-pilots to deal with mundane tasks. For example, HR professionals can use generative AI to write competency-level descriptions for different SMGs, freeing up time for more productive tasks.

Another demonstration of Generative AI is to automate the process of analysing spend data. It can learn from existing spend data and generate insights that could include identifying trends in spending habits, highlighting areas for cost-saving opportunities, or predicting future spending patterns based on historical data. This can help businesses make more informed decisions about their procurement strategies and potentially lead to significant cost savings and efficiency improvements.

Generative AI use case demonstrations may help identify opportunities across an organization and its ecosystem, and ensure the technology delivers maximum value. It is a rapidly growing field with many potential applications. Here are some examples produced by Bing Chat of generative AI use cases:

- Algorithm invention: Generative AI can be used to create new algorithms that can solve complex problems and optimize processes.
- Neural network design: Generative AI can be used to design neural networks that can learn from large datasets and make predictions.
- Text generation: Generative AI can be used to generate text for various applications, such as chatbots, customer service, and marketing.
- Image generation: Generative AI can be used to generate images for various applications, such as product design, advertising, and entertainment.
- Music generation: Generative AI can be used to create music for various applications, such as video games, movies, and commercials.
- Artificial creativity: Generative AI can be used to create art for various applications, such as fashion design, interior design, and architecture.
- Creative question-asking: Generative AI can be used to ask creative questions that can help businesses identify new opportunities and solve problems.

<u>Data integrity and security</u>

This is a critical joint responsibility for the DWAI in conjunction with senior data scientists. As revealed in a McKinsey article titled, 'The data dividend: Fuelling generative AI' September 15, 2023':

"An organization's proprietary data and its underlying foundations are the determining factors to what's possible with generative AI. Managing data is already one of the top challenges preventing organizations from scaling AI use cases.

There are more unknowns than knowns in the generative AI world today, and companies are still learning their way forward. It is therefore crucial for senior data scientists to set up systems to actively track and manage progress on their generative AI initiatives and to understand how well data is performing in supporting the business's goals.

Data cannot be an afterthought in generative AI. Rather, it is the core fuel that powers the ability of a business to capture value from generative AI. But businesses that want that value cannot afford senior data scientists who merely manage data; they need them understand how to use data to lead the business."

When AI co-pilots are made available to SMGs, they'll be able to make decisions from data originating across a whole task or process. It is vital then that the data being used is of the highest integrity, so SMG members are confident that they'll be able to meet their agreed goals.

Increasingly too, decision making is being automated. For instance, proprietary data including data from sensors along a business process within an organization or across its ecosystem can be sent to AI algorithms to make autonomous decisions. Arrangements must be in place to regularly monitor automated decision-making, often made in real time, to understand how well data is performing in supporting SMG goals and business strategic goals.

Assessing AI risks

The McKinsey report titled, 'The organization of the future: Enabled by gen AI, driven by people', provides a useful summary of the AI risks business leaders need to be aware of: -

"Boards need to be satisfied that the company has established legal and regulatory frameworks for the knowable generative AI risks assumed across the company and that AI activities within the company are continually reviewed, measured, and audited. They will also want to ensure surveillance mechanisms are in place to continually explore and assess risks and ethical concerns that are not yet well understood or even apparent. How, for example, will companies stand up processes to spot hallucination and mitigate the risk of wrong information eliciting incorrect or even harmful action? How will the technology affect employment? And what of the risks posed by third parties using the technology? A clear-eyed early view on where problems might lie is the key to addressing them.

Before business leaders can successfully incorporate gen AI into their business strategies and organizations, they must be clear about the risks it may pose and anticipate potential responses; it's the only way to maintain trust with and among employees, investors, and customers.

Among the risks are concerns about the types of biases that may be built into gen AI applications, which could negatively affect specific groups in an organization. There may also be questions about the reliability of gen AI models, which can produce different answers to the same prompts and present "hallucinations" as compelling facts.

Organizations may have trouble shielding some of their intellectual property (copyrights, trademarks, patents, and other legally protected materials) from being inadvertently exposed through a company's gen AI outputs. Similarly, bad actors could plug sensitive customer, supplier, or employee data into a gen AI model to create disinformation, deepfakes, and other types of malicious content.

Organizations will need to take a proactive role in educating regulators about the business uses of gen AI and engaging with standards bodies to ensure a safe and competitive future with the technology.

Develop a competency-based career path

Working with HR, the DWAI should assist with the development of a competency-based career path and remuneration program. The rationale for such a program is as follows: -

In DP2 organizations where the basic unit of work is the SMG, employees take responsibility for the control and coordination of their work within a framework bounded by agreed team goals and company policies and procedures. To sustain SMGs and foster a learning culture a competency-based payment program that drives goal achievement must be considered.

Competency-based pay is a method of pay progression that rewards employees for the breadth and depth of skill and knowledge they hold to meet their team goals. It is a major change from job-based pay embodied in many industry or enterprise-based awards.

Job-based pay is traditionally concerned with work that has been broken down into minimal tasks. It is a narrow de-skilling concept based on equal pay for equal work regardless of the business skills an individual may hold. Competency-based pay is concerned with employees attaining the essential skill and knowledge to contribute to team and organizational performance.

The mechanisms for building a competency-based career path and remuneration program are beyond the scope of this paper. However, for insights as to what skill and knowledge would be required for an organization planning to integrate AI, consider the following McKinsey article titled, 'Four essential questions for boards to ask about generative AI'.

The precise new AI skills required will vary by use case. For example, if the use case is relatively straightforward and can be supported by an off-the-shelf foundation model, the (DWAI) may be able to lead the effort with the help of a data and software engineer. But with highly specialized data—as might be the case for drug development—the company may need to build a generative AI model from scratch. In that case, the company may need to hire PhD-level experts in machine learning.

The board will therefore want to query leadership as to whether it has a dynamic understanding of its AI hiring needs and a plan for fulfilling them. Also, the existing workforce will need to be trained to integrate generative AI into their day-to-day work and to equip some workers to take on new roles. But tech skills are not the only consideration, as generative AI arguably puts a premium on more advanced analytical and creative skills to supplement the technology's capabilities. The talent model may therefore need to change—but with consideration of a caution raised recently at the World Economic Forum: using AI as a substitute for the work of junior-level talent could endanger the development of the next generation of creators, leaders, and managers.

Modifying the PDW to democratize both the workplace and AI

To democratize the workplace, that is, change the organizational structure from DP1 to DP2, involves two essential steps. They are: -

1. *Develop active adaptive strategic goals and AI vision.*

This requires running a SC with the leadership group to develop AI-related strategic goals and vision. The purpose of the SC could be "planning the future of organization XYZ in an AI world (2030)". A SC is an intense participative planning event involving careful preparation and organizing. SC managers need to make sure input is sourced from key players such as workplace personnel and ecosystem partners including AI vendors.

2. *Undertake a modified PDW or a planned series of modified PDWs to transform to a DP2 structure.*

More often than not, a PDW follows the stages outlined in the section 'Proven and practical approach for the democratization of workplaces.' However, when democratizing both the workplace and AI, the PDW must be modified. This is described as follows: -

The concept of a jointly optimized socio-technical system, or a democratized workplace, was first declared in the 1950s by Tavistock social scientists Eric Trist and Ken Bamforth. Their research on work performed in English coal mines led to this groundbreaking discovery. In the 1960s, Fred Emery and his Tavistock colleague, Einar Thorsrud, developed a socio-technical system (STS) method and

trialled it as part of the Norwegian Industrial Democracy project. This experimental method aimed to demonstrate the potential for democratizing organizations. After years of meticulous analysis and redesign, it was hailed as a success - marking the first instance of planned socio-technical change at a national level.

The initial STS method was highly analytical. Given its novelty and evolving nature, no aspect could be overlooked during early trials. Expert design teams conducted thorough technical and social analyses, using the data gathered to create an organizational design that optimized both the social and technical systems.

In the 1990s, I applied this STS methodology at a large paper mill. Our technical systems analysis revolved around a process known as variance analysis, while the social systems were evaluated using a comprehensive questionnaire. However, it's worth noting that the new organizational design - developed by an expert design team comprising paper mill management and employees under my guidance - was not well-received by the workforce. They rejected a design that felt imposed upon them. This outcome led me to the SC and PDW, both participative organizational change methodologies that centre on participants owning and committed to their plans and workplace designs.

In a typical PDW, and as shown in 'Briefing 2' in the earlier PDW diagram, participants undertake high-level process mapping along a whole task – from inputs to outputs. This analysis enables participants to understand how a whole product or service is produced. It can also indicate where key decisions are made or critical errors can occur (such as quality checks, prioritisation of work, and raw materials used) that impede performance.

But this type of analysis is not detailed enough for the democratization of AI. A more granular workflow analysis is required, something akin to the original experimental STS analysis.

One approach to identify AI opportunities is to conduct a 'Process Analysis' by mapping total organizational workflows and then across ecosystem workflows that are the 'life blood' for both. It is a method specifically designed to isolate decision-making points along a process and to examine the process steps involved to identify areas where improvements can be made. The process includes five steps: reviewing and identifying processes that are critical to the business and its ecosystem, collecting data, analysing processes with focus on decision-making points, identifying AI and other opportunities for improvement, and making changes.

There may need to be several iterations before all key players are confident that process analysis undertaken accurately describes how for instance, raw material is transformed into a product or information into a service. During the Telstra PDW mentioned in the 'OST Testimonials' section, it took a whole day before management, service engineers, IT specialists, and operational technicians were happy that the process developed accurately described the service activation and quality assurance workflows. Once finalised, PDW participants were able to continue their work of establishing a democratized workplace; in this case, it was a standalone greenfield or start-up business totally separated from the larger Telstra bureaucracy.

During a process analysis to democratize both the workplace and AI, PDW participants who would normally come from management, operational employees, and specialists from relevant parts of the business; and who have completed AI training, work together to identify areas where AI could be used to augment jobs, automate tasks, improve efficiency, and reduce costs. For example, businesses can use process analysis to identify areas where employees are spending a lot of time on

repetitive tasks that could be automated using AI. By automating these tasks, businesses can free up employees to focus on more complex tasks that require human expertise.

The process analysis can also be used to identify where decisions are made, which can often result in long delays. For instance, PDW participants can examine customer interactions with their business to identify areas where AI could be used to improve the customer experience. Chatbots and virtual assistants for example, can be used to provide customers with quick and accurate responses to their questions.

At the end of each PDW, employees not involved in the workshop must not only be briefed about a proposed DP2 design, but also be informed about the potential installation of AI technology. This briefing must also include opportunities to complete PDW steps such as the intrinsic motivators and the skills audit plus an understanding how AI may affect jobs. This step is critical. If employees don't have input into the PDW, they may feel that new ways of working are being imposed on them and will reject any changes, even though it may be of benefit to them, as was the case with paper mill STS redesign project mentioned above.

As the PDW(s) proceed to produce an integrated DP2 structure and the practicality steps are being completed, the conditions for the democratization of AI will start to take shape. During this period a second cross-functional group(s), with support from the core AI Advisory Group, will be working on identified AI opportunities to improve the customer experience, competitiveness, and productivity. It will require the involvement of key personnel to investigate and commence new product development. These players could include product managers, data scientists, data engineers, AI/ML engineers, HCAI designers, legal, privacy and ethics specialists, and domain subject matter experts.

An important responsibility for this cross-functional group is to tap into the experience of the AI Advisory Group to help identify the potential applications (use cases) of AI in the business and then prioritize these use cases based on factors such as budget, technical skills required, and potential benefits. This approach ensures that the AI implementation aligns with business strategic goals and SMG goals to deliver maximum value.

The number PDWs required to produce an integrated DP2 that is accepted by management and employees depends on the nature of the organization and is not covered in this paper. However, the end-goal of a SC and PDW project in our uncertain and rapidly changing AI world is that an organization must have active adaptive strategic goals and a structure that is agile and adaptive. It must have an AI-ready and adaptive culture to prosper and survive because in this environment change is happening in real time.

As Mark Govers and Pierre van Amelsvoort, the authors of a 13 February 2023 article: 'A theoretical essay on socio-technical systems design thinking in the era of digital transformation' state:

"With (detailed) process maps, we can now explore the possibilities offered by digital technology: which tasks in the process can be replaced by (digital) technology, which new tasks arise, which tasks are performed by people (employees or customers). Building on this, (new) processes can be organised. It is also possible that new products/services or new customer families emerge from digital technology opportunities.

And as organisations and eco-systems evolve over time, no design can be considered finished…This is especially true for digital technologies, as digital capabilities are constantly evolving. The capacity for continuous socio-technical optimisation therefore requires new design routines so that workers,

digital experts, and organization experts can work together effectively to design humane, productive, and innovative organisations."

The modified workflow analysis is the only PDW change required for both the democratization of workplaces and AI. There's no need for a social systems analysis via a comprehensive survey because the whole point of doing a social analysis as part of the experimental STS methodology was to work out what the social structure should look like. This is now achieved by conducting a PDW to change the design principle from DP1 to DP2.

However, once AI is under consideration or in use, there are all the supporting aspects of AI that need to be taken into account. For example, the mitigation of AI-related risks such as data privacy and security, equity, fairness, and compliance would be addressed by involving AI specialists in the practicalities section of the PDW (i.e., briefing 3).

At the moment this is a work-in-progress. I'm currently examining other supporting aspects of AI that need to be dealt with at both the organizational and ecosystem level. This analysis will be particularly important for those not familiar with the SC and PDW. It will show how these two OST methodologies can cover so many of these auxiliary AI factors including factors that relate to an organization's ecosystem, which is a critical piece of the AI integration jigsaw puzzle.

Conclusion

In the course of researching this paper, I came across numerous proposed 'solutions' for democratizing AI. However, in my experience, these solutions often lack in two critical areas: sustainability and practical implementation. While they provide extensive advice on the prerequisites for democratizing AI, they unfortunately fall short of offering tangible methods to achieve this objective.

My analysis revealed that to unlock the full potential of AI technology, it must be democratized, i.e., made accessible to all employees to bolster decision-making, innovation, and customer value. However, the safe and effective democratization of AI can only be achieved when workplaces are also democratized.

The paper suggests that to democratize both the workplace and AI, a modified PDW should be considered. This modification entails conducting a comprehensive process mapping analysis to identify decision-making points where AI may or may not be utilized.

A crucial aspect of successful AI integration is company culture. To establish an AI-ready culture, management must foster conditions that encourage employees to collaborate and enhance innovation and business performance. A struggle with innovation and change may indicate a lack of a learning culture and shared responsibility, which could also imply difficulties with AI integration.

The paper advocates for the application of OST methodologies, specifically SC and PDW, to cultivate an AI-ready culture. This involves designing organizations with a DP2 structure, leading to high levels of employee intrinsic motivation. However, it also underscores the challenges faced by DP1 organizations, which often fail to meet basic work needs due to the competitive nature induced by DP1. This can result in reduced cooperation, decreased quality and productivity, high turnover and absenteeism, and poor mental health.

The paper cautions against the risks of democratizing AI in a dysfunctional DP1 organization. For instance, disgruntled employees with access to AI technology could potentially damage a company's or an individual's reputation.

The paper concludes that if an organization's employee intrinsic motivation or engagement scores are low, it would be prudent to avoid democratizing AI. Conversely, high scores indicate a cooperative culture where employees can collaborate to identify HCAI opportunities and share responsibility for achieving their SMG goals. These cultural characteristics are vital for the safe and effective democratization of AI.

Articles referenced.

- **The Genotypical Design Principles and Democratizing Organizations** (www.socialsciencethatactuallyworks.com)
- **'Structure underlies other organizational determinants of mental health'** in the Journal of Systemic Practice and Action Research, (De Guerre et al 2008). A summary of this research can be found in 'Notes' below.
- **Put AI into action with Microsoft's AI Business School** – Explore our online leadership series and learn how to drive business impact by creating an effective AI strategy, enabling an AI-ready culture, innovating responsibly, and more. AI Business School Artificial Intelligence Courses - Microsoft AI
- **AI in Manufacturing: Solutions & Stories** | Microsoft AI. https://www.microsoft.com/en-us/ai/industry/ai-in-manufacturing
- The **Tech Blog** *by Peter H. Diamandis, MD 2023* **Embrace AI or Face Extinction**: "There will be two kinds of companies at the end of this decade: those that are fully utilizing AI, and those that are out of business."
- The Conversation: **"Calls to regulate AI are growing louder. But how exactly do you regulate a technology like this?"** — https://theconversation.com/calls-to-regulate-ai-are-growing-louder-but-how-exactly-do-you-regulate-a-technology-like-this-203050
- The Conversation: **"What is 'AI alignment'? Silicon Valley's favourite way to think about AI safety misses the real issues"** — https://theconversation.com/what-is-ai-alignment-silicon-valleys-favourite-way-to-think-about-ai-safety-misses-the-real-issues-209330
- The Conversation: **Snapchat's 'creepy' AI blunder reminds us that chatbots aren't people. But as the lines blur, the risks grow** Snapchat's 'creepy' AI blunder reminds us that chatbots aren't people. But as the lines blur, the risks grow (theconversation.com)
- The Conversation: **How ChatGPT might be able to help the world's poorest and the organizations that work with them** How ChatGPT might be able to help the world's poorest and the organizations that work with them (theconversation.com)
- The Conversation: **AI systems have learned how to deceive humans. What does that mean for our future?** https://theconversation.com/ai-systems-have-learned-how-to-deceive-humans-what-does-that-mean-for-our-future-212197
- The Conversation: **Does your employer have to tell if they're spying on you through your work computer?** https://theconversation.com/does-your-employer-have-to-tell-if-theyre-spying-on-you-through-your-work-computer-214857
- A MACHINE-INTELLIGENT WORLD. Editorial '**AI safety on whose terms?**' Seth Lazar is a professor of Philosophy at the Australian National University, Canberra, Australia and Alondra Nelson is Harold F. Linder Professor in the School of Social Science at the Institute of Advanced Study, Princeton, NJ, USA.
- **Four essential questions for boards to ask about generative AI** https://www.mckinsey.com/capabilities/quantumblack/our-insights/four-essential-questions-for-boards-to-ask-about-generative-ai?cid=eml-web

- **Deloitte. 10 use cases for AI across industries | Deloitte Australia How artificial intelligence (AI) can be harnessed to make an impact across industry**
- **Blog: On holding back the strange AI tide.** There is no way to stop the disruption. We need to channel it instead. ETHAN MOLLICK 23 JULY 2023 https://open.substack.com/pub/oneusefulthing/p/on-holding-back-the-strange-ai-tide?r=27knmq&utm_campaign=post&utm_medium=email
- **The Future Computed – AI and Manufacturing Microsoft** Microsoft_TheFutureComputed_AI_MFG_Final_Online.pdf
- A Five-Part Guide to Digital Transformation: **Learn How Manufacturers Can Build a More Resilient and Sustainable Future** MS 5-part guidw to digital transformation.pdf
- **Becoming an innovative organization.** Microsoft https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RWV4hg
- **Empowering employees with AI**: A look into how Microsoft uses AI to do business. MS Empowering employees with AI.pdf
- The state of AI in 2023: Generative AI's breakout year | McKinsey
- **A theoretical essay on socio-technical systems design thinking in the era of digital transformation** by Mark Govers, Pierre van Amelsvoort 13 February 2023 Springer
- McKinsey Technology Trends Outlook 2023 | McKinsey
- **Artificial intelligence: Top three roles under threat in small Australian businesses** https://www.msn.com/en-au/news/australia/artificial-intelligence-top-three-roles-under-threat-in-small-australian-businesses/ar-AA1gco6F?ocid=socialshare&cvid=9577062a153c44d886d39992747823d2&ei=37
- **The state of AI in 2023: Generative AI's breakout year** https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-in-2023-generative-ais-breakout-year
- **Gen AI in high gear: Mercedes-Benz leverages the power of ChatGPT** https://www.mckinsey.com/features/mckinsey-center-for-future-mobility/our-insights/drivers-of-disruption/gen-ai-in-high-gear-mercedes-benz-leverages-the-power-of-chatgpt?cid=eml-web
- **The organization of the future: Enabled by gen AI, driven by people** https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/the-organization-of-the-future-enabled-by-gen-ai-driven-by-people?cid=eml-web

Notes

Preventing Mental Health risks in the workplace

In 2008, Peter Aughton participated in joint Canadian and Australian mental health in the workplace research project. Our analysis of the mental health data clearly shows that organizational structure is the single most contributing factor that affects employee mental health.

In all but one case of analysing the factors that affect low positive and high negative emotions, prevention depends on DP2 (Low tiredness depends on not having DP1).

From our research it can be concluded that organizational factors contribute to mental health. That is, management has the power to improve employee mental health, and therefore productivity by putting in place a DP2 structure.

Our research was published in a paper entitled *'*Structure underlies other organizational determinants of mental health*'* in the *Journal of Systemic Practice and Action Research*, (De Guerre et al 2008) where we show that workplaces are implicated in the current global epidemic of mental illness.

OST Testimonials

Microsoft

"Microsoft has been using Search Conferences for several years, mainly for product planning purposes. It fits Microsoft culture because it's a practical way for a group to meet face-to-face and agree on an outcome they desire—creative plans for making creative products." Kevin Purcell, Executive and Management Development, Microsoft Product Group, USA

Telstra

"Today QANTAS announced that Telstra has won its Preferred Supplier Award. Two years ago we interviewed a number of QANTAS senior managers and were told that Telstra would never be considered a preferred supplier. The award makes particular mention of the 'high value service delivery, technical performance and process re-design'. All these things relate directly to us using the OST processes of Search Conference and Participative Design (DP2)." Neville Brien, Telstra's Manager of Product & Service Integration

Syncrude

During the 1990's Syncrude Canada Ltd underwent massive organisational redesign using the Participative Design process. The new self-managing team structure reduced management and supervision by 50% and increased workforce productivity by 83%

Karadoc Winery

Bob Baxter, General Manager of Karadoc Winery contributes an ongoing annual increase in productivity of more than 7% to self-managing teams

J Robins & Sons

"Before self-managing teams we could not make a shoe and get it onto the customer's shelf in less than 3 weeks. Now the teams can make a shoe in less than 2 hours, which means we can now take a customer order size of one! In the last few years our share of Australian shoe production has gone from 12% to over 60%." Phil Butt, CEO, J Robins & Son

Use of Microsoft AI-powered Edge and Bing Chat

In the process of drafting this discussion paper, I utilized Microsoft Edge and Bing Chat, both powered by OpenAI's language model, as my co-pilots. They assisted in addressing AI-related queries, sourcing relevant information, and providing clear explanations.

These co-pilots proved invaluable during instances of 'writer's block', offering alternative perspectives to my initial drafts. Their suggestions often resulted in more concise text, enriched with a variety of adjectives, enhancing the overall readability for the audience.

FYI dear reader, the above two paragraphs were produced by Bing Chat!

DP2 and Indigenous Cultures

The connection between DP2 and Indigenous cultures is intriguing. Merrelyn Emery, who has extensive experience working with Indigenous communities across Australia and the Mohawk in the US and Canada, asserts that these cultures were governed entirely by DP2. This fundamental difference in societal structure is a key factor in the ongoing misunderstandings between Indigenous

and non-Indigenous communities. Many people, unfamiliar with the organizational design principles of DP1 and DP2, fail to recognize their presence and influence in everyday life. Merrelyn has written extensively about these ancient cultures, with some of her work available on: - www.socialsciencethatactuallyworks.com

Interestingly, there's an Indigenous backstory to cutting-edge methodologies like the PDW, which are used to help 'modern' businesses integrate AI. These DP2 cultures, which have existed for thousands of years, offer valuable insights that can aid today's businesses in democratizing AI to enhance decision-making, innovation, and productivity. It's a testament to the timeless wisdom of these ancient societies and their potential contribution to our technological future.

AI/ML Glossary of terms according to Microsoft Edge

Generative AI refers to the use of artificial intelligence to create new content, such as text, images, music, audio, and videos. It works by using a machine learning model to learn the patterns and relationships in a dataset of human-created content, and then uses the learned patterns to generate new content.

Human-centred AI (HCAI) aims to create AI systems that augment human abilities, needs, and values. It learns from human input and collaboration and operates transparently, equitably, and respectfully. The goal is not to replace humans but to enhance our capabilities through intelligent technology.

Machine learning is a subfield of artificial intelligence (AI) that uses algorithms trained on data sets to create self-learning models. These models are capable of predicting outcomes and classifying information without human intervention. It involves using pattern recognition software to find trends in data, building models that explain the trends/patterns, and then using the models to predict something.

Here are some examples of machine learning applications:

1. Image recognition: Machine learning can be used to teach computers how to identify an image's contents.
2. Speech recognition: Speech recognition is being improved by machine learning algorithms.
3. Recommendation engines: These suggest products, songs, or television shows to you, such as those found on Amazon, Spotify, or Netflix[3].

A large language model (LLM) is a type of language model notable for its ability to achieve general-purpose language understanding and generation. LLMs acquire these abilities by using massive amounts of data to learn billions of parameters during training and consuming large computational resources during their training and operation. They are artificial neural networks (mainly transformers) and are (pre-)trained using self-supervised learning and semi-supervised learning. As autoregressive language models, they work by taking an input text and repeatedly predicting the next token or word.

An example is GPT-3 by OpenAI, launched in 2020 with 175 billion parameters, covering more than 95 natural languages and 12 code languages.

Traditional AI, often called Narrow or Weak AI, focuses on performing a specific task intelligently. It refers to systems designed to respond to a particular set of inputs. These systems have the capability to learn from data and make decisions or predictions based on that data.

Some examples of traditional AI include: -

1. Computer Chess: The computer knows all the rules; it can predict your moves and make its own based on a pre-defined strategy.
2. Voice Assistants: Siri or Alexa have been trained to follow specific rules, do a particular job, and do it well.
3. Recommendation Engines: Netflix or Amazon use AI to suggest content based on your viewing history.
4. Search Algorithms: Google's search algorithm uses AI to provide the most relevant search results.
5. Predictive Modelling: Traditional AI is used in predicting future outcomes based on historical data.
6. Intelligent Alerting: AI can alert you if it detects an anomaly, such as a customer's spend exceeding a certain threshold.
7. Natural Language Processing for Text Classification: AI can extract and categorize names of people, organizations, and contract value from text.

Generative AI, or generative artificial intelligence, refers to the use of AI to create new content, like text, images, music, audio, and videos. It is powered by foundation models (large AI models) that can multi-task and perform out-of-the-box tasks, including summarization, Q&A, classification, and more. Generative AI works by using a machine learning model to learn the patterns and relationships in a dataset of human-created content. It then uses the learned patterns to generate new content.

Here are some examples of generative AI:

1. ChatGPT: An AI language model developed by OpenAI that can answer questions and generate human-like responses from text prompts.
2. DALL-E 2: Another AI model by OpenAI that can create images and artwork from text prompts.
3. Google Bard: Google's generative AI chatbot and rival to ChatGPT.
4. Ada: A doctor-developed symptom assessment app that offers medical guidance in multiple languages. Optimized with the expertise of human doctors, Ada utilizes AI to support improved health outcomes and deliver exceptional clinical excellence.
5. SkinVision app: An app for early detection of skin cancer. With its regulated medical service, AI technology, and expert input, it teaches users to self-examine, understand risks, and address immediate concerns.
6. Virtual volunteer / Be My Eyes: An AI app designed for visually impaired individuals that harnesses the power of GPT-4 to convert images into text instantly. Users can send images through the app for immediate identification, interpretation, and conversational visual assistance.

Updated Peter Aughton BIO and contact details

Peter Aughton is an Open Systems Theory (OST) practitioner who has worked with organizations from both the private and public sectors since 1993. OST is a socio-ecological (people-in-system-in-environment) body of knowledge that relates people and their organizations to their environments. Two key methodologies translated from OST are:

1. The Search Conference – a large group participative planning event for establishing active adaptive strategic goals and strategies in very uncertain environments.
2. The Participative Design Workshop – an organizational redesign process for creating democratic team-based structures that significantly increase intrinsic motivation, innovation, and business performance.

Since 1993, Peter was a director and then Managing Director of AMERIN Pty Ltd, which specialised in applying the OST methodologies of SC, PDW and Unique Designs. Recently Peter stepped down as MD of AMERIN to concentrate on mentoring and advising those who wish to understand OST and apply its methodologies. He is currently supporting the members of opensystemstheory.org.

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