

Industrial Engineers Australia(IEA)

Incorporated as Institute of Industrial Engineers Australia(IEA) in 1959
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Industrial Engineering is concerned with the analysis, design, improvement, installation and management of integrated systems of human resources, data, finances, materials, equipment, and energy as safely as possible with minimum impact on the environment, delivered within a holistic methodology.

INDUSTRIAL ENGINEERS MAKE IT HAPPEN BETTER

The three key objectives of the IEA are:-

1. TO UNDERTAKE AN ACTIVE AND VARIED PROGRAM FOR MEMBERS
2. TO PROMOTE AND ENHANCE THE TRAINING OF INDUSTRIAL ENGINEERS
3. TO PROMOTE AND CAMPAIGN FOR INDUSTRIAL ENGINEERING OPPORTUNITIES WITHIN INDUSTRY

NEWSLETTER 16-June/July 2023

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FROM THE EDITOR-David Karr(CP Eng, FIEA)

Welcome to the third issue of the IEA newsletter for the 2022/23 year. We are back again for another interesting update of IE and the IEA.

The IEA Newsletter thrives on interesting and updated articles regarding the world of Industrial Engineering(IE). This issue we have 3 member articles.

To reiterate, at the recent AGM/IE Conference it was decided to **REQUEST AT LEAST ONE IE RELATED ARTICLE FROM EACH MEMBER EVERY TWO YEARS.**

This will allow our members to contribute to the organisation and to pass on their experiences. We are getting there slowly.

It would be appreciated if members could, provide an interesting IE article detailed or just an A4, to the editor at editor@iea.org.au by **August 30th**. Please also supply a headshot photo.

Thanks to all those members who have already provided interesting IE articles.

Information on the upcoming AGM/IE Conference is provided in From the President segment.

Hope to see you all at the upcoming IEA AGM/Conference in November.

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FROM THE PRESIDENT-David Karr(CP Eng, FIIEA)

Welcome to the June/July 2023/24 issue of our quarterly newsletter.

We welcome our new members:-

- Emmanuel Agyarko Brobbey
- Joseph Folawewo
- Deepak Kansal
- Keegan Marais
- Rey Edward Solicito
- Jayson Sugpatan



I wish these new members well and hope they will contribute actively to IE and the IEA.

I met up with Keegan Marais and welcomed him to the IEA. We discussed promoting IE in Australia as well as employment opportunities for IEs. I am pleased to announce that Keegan has found employment.

The 2023 AGM is planned for Saturday 18th November. The format will be similar to 2022 with a Hybrid F2F/Online format. It will be held at the Hotel Grand Chancellor(as with 2022)

The AGM/IE Conference date change ties in with the IEOM Society International – Industrial Engineering and Operations Management Society Conference in Melbourne from November 12-14, 2023. The conference will be a hybrid meeting.

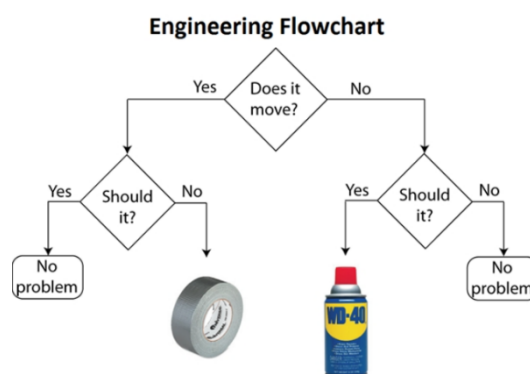
I will be presenting a paper on Industrial Engineering in Australia.

(Ref <http://ieomsociety.org/melbourne2023/>)

The website has been updated. All events are listed also is Past Events allowing access to previous events webinars. www.iea.org.au/events

A reminder for members to settle their renewals for the 2023/24 FY. That would be much appreciated.

David Karr(CP Eng, FIIEA)
Federal President



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FROM THE DIVISIONS

Federal

- Meet the President 3/5-this was only attended by 6 members. Some issues were raised. Most were resolved.

WA

- Curtin-student awards nite 31/3 , Logbook IE presentation 19/4, 1st year student project assessment 23/5
- UoMelbourne IE & Game Theory presentation 17/3
- Konica Minolta Autonomous Mobile Robot (AMR) 10/3. This attended by over 70 participants. Interesting questions raised by impact of autonomy and AI.



- Rio Tinto Operations Centra (RTOC) 7/3-10 expectant members attended this long awaited event. RT demonstrated their level of autonomy of their operations from

Economy planning → Customer demand (steel) → Steel Manufacturing Production Capacity → Ship Unloading → Transport by Sea → Ship Loading → Transport by train → Loading of Train → Mixing of Ore → Crushing of Iron Ore → Loading onto Crusher Conveyor → Transport of Ore from Mine by Truck → Loading of Ore on to Truck → Blasting Ore body → Drilling of Blast Holes → Clearing of Land → Surveying → Planning for Mine Operations etc etc etc



QLD

- Assisted with RAeS promoting STEM in the schools
- Prof Charlene Yauch of Uni of Wisconsin Madison 12/7-Will look at Relevancy Of Industrial Engineering (IE) in the Future Workspace including impact of autonomous operations and AI. This should be very interesting

The website has been updated. All events are listed also is Past Events allowing access to previous events webinars. www.iea.org.au/events

INDUSTRIAL ENGINEERING IN AUSTRALIA BY CHATGPT



Image generated by NightCafe

Industrial engineering is a field of engineering that focuses on optimizing complex systems and processes to increase efficiency, productivity, and profitability. In Australia, industrial engineering is a well-established field that is essential to many industries, including manufacturing, construction, healthcare, transportation, and logistics.

Industrial engineers in Australia are trained to design and implement systems that integrate people, machines, materials, information, and energy. They use analytical methods and computer simulations to identify and eliminate bottlenecks, reduce waste, improve quality, and increase safety.

Some of the key areas of focus in industrial engineering in Australia include:

Operations management: designing and managing production and service systems, including inventory management, scheduling, and quality control.

Supply chain management: coordinating the flow of goods and services from suppliers to customers, including procurement, logistics, and distribution.

Ergonomics: designing workstations, tools, and equipment that are safe, efficient, and comfortable for workers.

Human factors engineering: studying the interaction between people and technology to improve the design of products and systems.

Data analytics: using statistical and mathematical methods to analyze and optimize processes.

Industrial engineers in Australia typically have a bachelor's or master's degree in industrial engineering, and may be certified by the Institution of Engineers Australia or other professional organizations. They may work for a wide range of organizations, from small businesses to large multinational corporations, and may specialize in a particular industry or area of expertise.

Industrial Engineer

(noun)

1. Like a normal engineer, but cooler.

TECHNOLOGICAL TRENDS IN INDUSTRIAL ENGINEERING AND WHERE WE'RE HEADING IN THE FUTURE by KEENAN MARAIS(GIIEA)



Industrial engineering is the engineering profession that is concerned with the optimization of complex processes, systems, or organizations by developing, improving and implementing integrated systems of people, money, knowledge, information and equipment. Industrial Engineering separates itself from the rest of Engineering disciplines due to its flexibility and adaptability to multiple business industries and continuous changing environments. Industrial engineering stands at the forefront of innovation, integrating emerging technologies to reshape the manufacturing landscape. In this article, we delve into the exciting advancements and trends that are set to define the future of industrial engineering.

Industry 4.0 and the Internet of Things (IoT):

The Fourth Industrial Revolution, commonly referred to as Industry 4.0, is ushering in a new era of industrial engineering. The integration of IoT devices, sensors, and connectivity across manufacturing systems enables real-time data collection and analysis. Industrial engineers can leverage this data to optimize production processes, monitor equipment health, and implement predictive maintenance strategies. The IoT ecosystem facilitates seamless communication between machines, systems, and stakeholders, leading to enhanced productivity, reduced downtime, and improved decision-making.

Artificial Intelligence (AI), Automation and Machine Learning:

AI and machine learning are revolutionizing industrial engineering by enabling automation, intelligent decision-making, and advanced analytics. Firstly, AI algorithms, combined with historical sales data, market trends, and external factors, can provide precise demand forecasts, enabling proactive decision-making in terms of production planning, scheduling, supply chain management, procurement, and logistics. Through this, industrial engineers would be able to achieve more efficient resource allocation, inventory management, and production line optimization, causing the company to minimize stockouts, reduce holding costs, improve productivity, streamline supply chain operations and other various cost savings. AI-powered predictive maintenance systems have also greatly enhanced the reliability and performance of industrial equipment. Machine learning algorithms can analyse patterns and identify potential failures before they occur which allows for scheduled maintenance, reduced downtime and minimal repair costs. AI algorithms have also greatly improved automation technology. Material handling equipment robots will now have the ability to perceive and respond to their environment. These collaborative robots, would work alongside human workers, assisting in repetitive or hazardous tasks, enhancing productivity, efficiency and ensuring worker safety. Lastly, machine learning algorithms can analyse images or video streams in real-time, detecting defects, anomalies, or deviations from the desired quality standards. This information in turn can allow for people to find the root causes of defects for more productive machine development, saving costs for rework and discarding products. AI algorithms are a great development in technology which will allow industrial engineers to create more productive, efficient, safer and cost-effective work environments.

Augmented reality workspaces:

Imagine being able to maximise the space you are currently using by putting on a VR headset and it creates your own customisable workspace for your own optimal performance. As an industrial engineer you would be able to have complete creative freedom to monitor, instruct and improve on any process going on in the facility through VR without having to move anywhere. Currently in logistics, AR glasses are used in the warehouse picking process in which VR headsets allow for you to see information about the items that need to be picked up and where they need to go next, by following the app's information, any worker would be able to pick at a higher efficiency and much more accurately. Not only this, but new employees could go through workplace training by practicing procedures and activities without the risk. AR technology will continue to create opportunities for eliminating safety hazards, improve information flow between personnel and departments, create more productive and interactive environments and assist with preventative maintenance and scheduling. Real world examples of companies who already employ these practices are Walmart, DHL, Coca-Cola, Amazon, and Ikea who have all adopted AR and VR workspaces to boost productivity in certain areas of their facilities.

Big Data Analytics and Optimization:

The abundance of data in the manufacturing environment presents both a challenge and an opportunity for industrial engineers. Harnessing the power of big data analytics, industrial engineering is evolving towards data-driven decision-making and optimization. Advanced analytics tools can extract actionable insights from complex datasets, enabling predictive maintenance, demand forecasting, and supply chain optimization. By leveraging these analytics, industrial engineers can identify bottlenecks, streamline processes, and enhance overall operational efficiency.

Sustainability and Green Manufacturing:

As environmental concerns gain prominence, industrial engineering is increasingly embracing sustainable practices and green manufacturing principles. Engineers are implementing energy-efficient processes, recycling and waste reduction strategies, and eco-friendly materials in product design. Additionally, the integration of renewable energy sources and the adoption of circular economy models are reshaping manufacturing practices. Industrial engineering plays a vital role in developing sustainable solutions that minimize environmental impact while maintaining productivity and profitability.

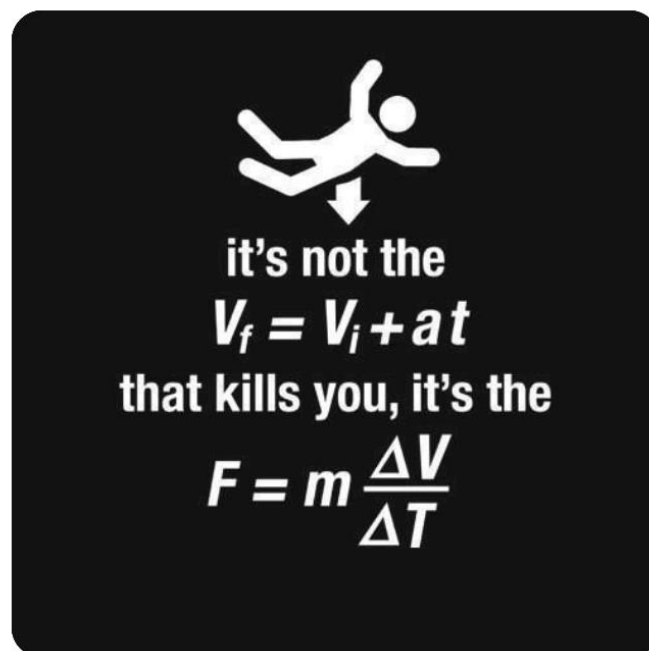
Ethics of technology driven industry

We must also remember the cost at which some technologies come with. As a philosophy, industrial engineers strive to enhance the working environments for the regular workers, to make their lives easier, safer and to ensure their continued development. While automation brings numerous benefits, such as increased productivity and cost savings, it also raises concerns about potential job displacement and the social impact on workers. There are certain things that should be taken into account if we want to progress in the technology driven approach and we as industrial engineers should be aware of what our responsibilities are in this development. Reskilling and upskilling the workforce is essential in order to provide opportunities for workers and transition them into roles that complement automation. Employers, educational institutions, and governments should collaborate to ensure that individuals are equipped with the skills needed for new job opportunities created by automation. Machines and robots should be designed to work alongside humans, augmenting their capabilities and enhancing productivity. Proper design and implementation of human-machine interaction ensure a harmonious and safe working

environment that optimizes both efficiency and human well-being. We should aim to redesign jobs rather than eliminate them. Analysing the work processes and identifying tasks that can be automated, allows workers to transition into roles that require higher-level skills, creativity, problem-solving, emotional intelligence and decision-making. This way, companies can tap into their employee's expertise and insights, fostering a new sense of ownership and empowerment. Social impact assessments should be done to identify potential risks and develop mitigation strategies. These assessments should address concerns such as job displacement, income inequality, and the overall well-being of workers and communities. Ethical considerations, including data privacy, algorithmic bias, and transparency, should also be integrated into the design and deployment of automation systems. When it comes to socially responsible automation, we as industrial engineers should conduct ethical engineering by prioritizing reskilling, collaboration, job redesign, ethical considerations, and community investment. We should guide organizations along the automation journey in a way that benefits both efficiency and the well-being of workers and society as a whole.

Conclusion:

The future of industrial engineering is poised for remarkable transformations driven by emerging technologies. Industry 4.0, AI, advanced robotics, big data analytics, and sustainability initiatives are revolutionizing the field. As industrial engineers embrace these advancements, they will shape smarter factories, optimize supply chains, and unlock unprecedented levels of efficiency and productivity. By staying at the forefront of technological innovation, industrial engineering will continue to drive progress, adapt to changing demands, and lead us into a new era of manufacturing excellence. We should aim for greater progress while also maintaining our ethics as engineers, and we will all come to a more progressive and efficient future.



EXPLORING EMERGING TECHNOLOGIES (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING) FOR INDUSTRIAL ENGINEERING AREA OF PRACTICE.

by Mohan Ganavarapu



Artificial intelligence (AI) and machine learning (ML) are transforming various industries, including manufacturing, banking, education and training, agriculture, healthcare.

Industrial engineers (IEs) can consider using these technologies by applying them to their own work and adding new skillset. In this article, we will explore how IEs can leverage AI to enhance their own professional development and career prospects.

AI applications in AI applications in various industries but not limited to

AI can help improving efficiency, quality, and safety systems and processes. For example, IEs can use AI to optimize the scheduling of staff, resources, and customers, reduce waste and errors, and enhance better outcomes and satisfaction. AI can also help in design and implement innovative solutions, such as smart technologies, robotics, chatbots, and decision support systems etc. in manufacturing, IEs proficient in AI can work in manufacturing and use AI to improve quality control, streamline production processes, and reduce wastage.

AI skills for Industrial Engineers

To leverage AI effectively, IEs need to develop some basic AI skills, such as data analysis, programming, and modelling. These skills can help IEs understand how AI works, how to use existing tools and platforms, and how to create and evaluate AI solutions. IEs can also benefit from learning about the ethical, legal, and social implications of AI, as well as the best practices and standards for AI development and deployment.

AI Training and Education Providers in Australia

Monash University Australia

Master of Artificial Intelligence

Graduate Certificate of Artificial Intelligence

Graduate Diploma of Artificial Intelligence

<https://www.monash.edu/study/courses/find-a-course/artificial-intelligence>

RMIT University

Master of Artificial Intelligence

<https://www.rmit.edu.au/study-with-us/levels-of-study/postgraduate-study/masters-by-coursework/master-of-artificial-intelligence>

Deakin University

Master of Applied Artificial Intelligence

<https://www.deakin.edu.au/course/master-applied-artificial-intelligence>

Torrens University Australia

Bachelor of Software Engineering (Artificial Intelligence)

<https://www.torrens.edu.au/courses/design/bachelor-of-software-engineering-artificial-intelligence>

Master of Software Engineering (Artificial Intelligence, Advanced)

<https://www.torrens.edu.au/courses/design/master-of-software-engineering-artificial-intelligence-advanced>

The University of Adelaide

Master of Artificial Intelligence and Machine Learning

https://www.adelaide.edu.au/degree-finder/maiml_maiml.html

AI learning resources for IEs

There are many resources available for IEs who want to learn more about AI and ML. Some of these resources include online courses, books, podcasts, webinars, blogs, and newsletters. IEs can also join online communities, forums, and networks where they can interact with other professionals, experts, and learners who share their interests and goals. Additionally, IEs can attend workshops, conferences, and events where they can learn from the latest research and practice in AI and healthcare.

AI career opportunities for IEs

AI can open up new career opportunities for IEs who want to advance their knowledge and skills. IEs can pursue various roles and positions that involve AI, such as data scientists, AI engineers, AI consultants, AI project managers, AI researchers, and educators. IEs can also work in different sectors and domains that use AI, such as healthcare providers, pharmaceuticals, medical devices, biotechnology, public health, and policy.



INDUSTRIAL ENGINEERING-NEW MEMBER - DEEPAK KANSAL(MIIEA)



It is with great pleasure and sense of humble gratitude that I introduce myself as a newly minted member of Industrial Engineers Australia. As I embark on this journey of Professional growth and collaboration, I am excited to connect with fellow industrial engineers who share a passion for optimizing business processes, enhancing productivity and driving business success.

My name is Deepak Kansal and I have recently joined the Institute as a member. With a profound belief in power of continuous improvement and dedication to continuous professional development, I have been contributing to the field of Industrial Engineering throughout my career. I am thrilled to be part of this esteemed community of professionals who are at the forefront of shaping the future of Industrial Engineering.

In addition to holding a Bachelor's degree in Industrial Engineering, I have obtained several industry recognized certifications that provided me with knowledge and expertise to serve areas of business process management, business process improvement and data analysis.

I am a certified Business Process Professional (CBPP) from Association of Business Process Management Professionals (ABPMP), a certified Business data analyst (CBDA) from International Institute of Business Analysts (IIBA), MOST certified and holder of Six sigma Green Belt certificate from American Society for Quality (ASQ). Through my education and certifications, I have cultivated a deep understanding of principles and techniques that drive Industrial Engineering success.

Building upon my educational foundation and certifications, I have had the privilege of applying my knowledge and skills in the field. Throughout my career, I have had the opportunity to lead strategic analysis, conducting time motion studies, development of labour standards, contributing to the development of direct wage budgets for a reputed retailer, Process mapping, development of metrics and KPI's, optimise workforce scheduling, and analyse workforce data to drive actionable recommendations. These experiences have allowed me to witness firsthand the transformative impact that Industrial engineering can have on operational performance and efficiency. I am driven by the continuous pursuit of improvement and always strive to identify opportunities to enhance customer experience, streamline operations and deliver measurable results.

I am eager to contribute my practical experiences and knowledge to the industrial engineering institute. By collaborating with fellow members, sharing insights and exploring new methodologies, I am confident that together we can shape the future of industrial engineering and make a lasting impact on organisations across industries.



There is a bright side to office interrupters

The next time an annoying colleague knocks on your door, derailing a brilliant moment of professional enlightenment, remind yourself that at least you are not lonely

The Economist

Even people who love their jobs have a few gripes. Even people who excel at their work have their share of worries.

The office environment makes it hard to concentrate; their colleagues are annoying beyond belief; their career path within the organisation is not obvious.

There are aspects of the workplace, like "reply all" email threads and any kind of role-playing, which are completely beyond redemption. This column is here to administer the balm of consolation for some of work's recurring irritations.

Start with a pervasive problem: being interrupted.

You have muted notifications

a worker's feelings of connection. The next time a knock comes, remind yourself that at least you are not lonely.

What about some of the characters who make office life so teeth-grinding? Every company has its share of toadies who specialise in managing up: flattering the bosses and claiming more credit than is their due. Unctuousness is undoubtedly irritating. But it, too, can sometimes have wider benefits.

Recent research by Wei Cai of Columbia Business School and her co-authors found that teams performed better when they had some crawlers among them. People who got better assessments from their superiors than from their peers in performance-review processes were designated as "upward influencers" in the study. Too many characters of this sort is bad: at some point,



on Slack and cleared your calendar; the Prelude from Bach's Cello Suite No.1 is playing; your fingers are poised above the keyboard and a thought of world-altering profundity is gradually taking shape in your mind.

Then there is a knock at the door, and a colleague asks if you have a minute to discuss the air-conditioning. By the time they have gone, so has that momentous thought and any sense of well-being.

Context-switching of this sort is more than simply annoying. A survey conducted in 2021 found that it takes people nine and a half minutes to resume a focused state of mind after switching between apps. But there is a bright side to being interrupted.

A paper by Harshad Puranik of the University of Illinois Chicago and his co-authors asked a sample of employees in America to record how often they were distracted by colleagues and to report their sense of belonging to their organisations. They found that being interrupted involves a social interaction with colleagues that can strengthen

team members will expend more effort competing for recognition than getting actual work done.

But because these personality types are prepared to invest more time communicating with their managers, the presence of a handful of them ensures that a team does not become invisible to the bosses. A few suck-ups can be good for everyone.

What of traits that workers find most irritating about themselves, the things that may be holding them back? Impostor syndrome, the belief some people have that they do not deserve to be in positions of influence, is usually thought of as being bad for individuals and organisations alike. But it can have an upside.

Research by Basima Tewfik of the MIT Sloan School of Management found that people who worry about being an impostor are regarded by others as having better interpersonal skills than those who are untroubled by self-doubt. It may be that a concern about lacking competence leads people to compensate by developing

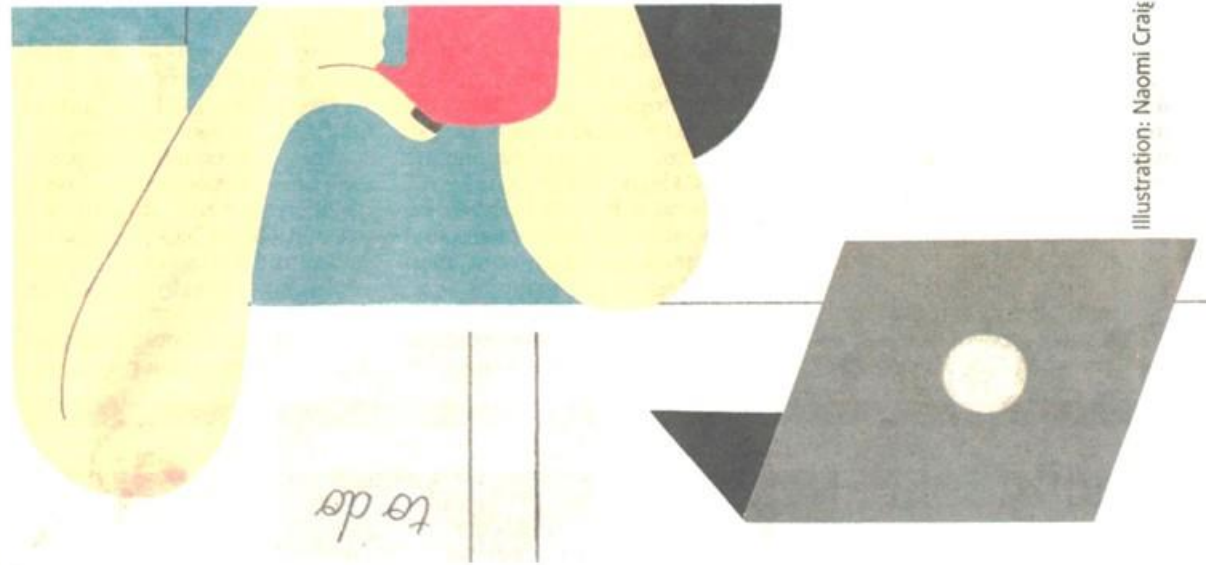


Illustration: Naomi Craig

stronger relationships with others. In a world that increasingly prizes collaboration and soft skills, that is not to be sniffed at.

Weaknesses can turn into advantages in other ways, too. The idealised entrepreneur may drip with confidence and charisma, for example. But not everyone fits that mould.

In a recent study, Lauren Howe and Jochen Menges of the University of Zurich asked

participants in an investment game who had been asked about their own flaws to allocate funds to startups.

They found that entrepreneurs who reveal a personal shortcoming, such as indecisiveness or insecurity, are more likely to attract funding from investors who share these same characteristics. Some weaknesses are not to be admitted: stupidity, say, or

narcolepsy. But flaws can sometimes help people get ahead, not hinder them.

The problem with silver linings is that they are attached to clouds. You are still being interrupted all the time.

You are still surrounded by annoying colleagues. Impostor syndrome still causes you unnecessary anxiety.

But there are bright sides to most things in office life, and they go beyond the payslip.

That's all Folks

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