# MANUFACTURING

4











Michael Yao, CEO and Co-founder, Homa Appliances

MANUFACTURING is a subject we have seldom communicated about, if not on a one to one basis and for strictly technical reasons when discussing projects with partners and clients. It is certainly not something we have theorised about, either, yet manufacturing is really what we are into, since the beginning. We were born a small factory 20 years ago, and in less than a generation, we have become the world's choice supplier of cooling products. In all these years, our production mindset, our perspective and philosophy about manufacturing have grown alongside the continuous development of our industrial footprint. Today, though with great humility, I am pleased to share our thoughts on the matter through the testimonies of Homa's production and R&D people, compiled into a monograph dedicated to the various fascinating aspects of manufacturing, with the added, valuable contribution of international experts providing the latest insights on the discipline.

The aim of this publication is to offer a further view of our true self, of our inner workings and how Homa is not only moving with the times but is actually part of the mechanism that contributes to shaping the future of the industry through the continuous improvement of its manufacturing practices. In our first ten years production increased fivefold, by 2023 it will grow a further three times, reaching the fifteen million units per year mark. This could not be achieved without the profound and continuous transformation of our production organisation and a formidable, sustained effort in the building of our industrial capability.

Among the topics treated in this monograph, that of mass customisation is certainly one of the most current themes. It is particularly relevant for the OEM/ODM world, since the need to balance competitiveness and flexibility is vital. Being able to offer craft-like customisation, as opposed to standardisation, to clients in order to serve their own brand identities and quality requirements is only the first element of the equation as competitiveness, given by large scale production, remains an indispensable part of the proposition.

Also, quality is carefully analysed

under various perspectives, for end consumers nowadays will not settle for anything less than perfection, intended as the complete satisfaction of their expectations, and in most cases, aspirations. Objective quality versus perceived quality is the question standing at the centre of the guality debate. Today, the refrigerator has become one of the symbols of our social accomplishments and the emblem of your lifestyles, hence emotions, perceptions and feelings seem to have in some sort gatecrashed the otherwise very rational and material terrain of industrialisation and production logics.

People become therefore increasingly important in this new conception of production, not only in terms of strategic planning and engineering competencies, but also as the focus of the company's attention to being true to the three pillars of its culture, care being one of them, in every aspect of its life. Talent attraction and retention, especially in the new-normal era, is a challenging task for HR functions across the globe. Many things have changed, and employees' expectations and aspirations have considerably evolved.

Logistics and supply-chain dynamics are also included in this monograph as subjects of interest. Until very recently they were almost unknown to those not directly involved in them, but have dramatically come to the fore following recent events such as the global pandemics, the war in Ukraine, climate change and Brexit, to mention only a few. As far as climate change is concerned, there is the added element of sustainable production, on top of that of the products themselves, no longer considered an added value, but absolute must-haves.

Beyond the lucid, thorough analysis of the present state-of-the-art of

production in its many aspects, this monograph also reflects on possible future scenarios and the potential impact of new, disruptive elements such as blockchain technology. Homa will embrace the future to come, and continue to supply the world with the best-in-class innovative, authentic food preservation products. It will do it with the same spirit of care and attention, while continuing to offer the most competitive proposition.



# 10

DISCOVERING THE HEARTBEAT OF HOMA: A JOURNEY THROUGH OUR FACILITIES





HOMA'S DEDICATION TO QUALITY AND CUSTOMER SATISFACTION

An interview with Yunlan Liu General Manager of Quality at Homa aische cie

22

MASS CUSTOMISING COOLING PRODUCTS IN A PERSPECTIVE OF SUSTAINABLE MANUFACTURING

An interview with Marco Taish Full Professor at Politecnico di Milano





36

CRYPTOMANUFACTURING 5.0



MANAGING SUPPLY CHAIN CHALLENGES IN A DIGITALLY TRANSFORMED WORLD





QUALITY IN THE EYE OF THE BEHOLDER

An interview with Silvia Torretta, Studio Volpi Technology Director



THE YOUNG, THE PRIME AND THE WISE

Generational perspectives on Research & Development

# DISCOVERING THE HEARTBEAT OF HOMA: A JOURNEY THROUGH OUR FACILITIES

Homa greets 2023, its 20th year of production, with a spectacular evolution in products and manufacturing! Since 2003, the year that Homa kicked off production as a global OEM/ODM manufacturer of cooling appliances, we have been through a series of impressive growth milestones. Within two years of the start, production hit 1 million units, and by 2009, we were no.1 exporter to the EU and globally. 2012 saw production reach 5M units and by 2015 this had doubled to 10M units. 2019 brought the 10th consecutive win on exportation, while in 2021 construction began of an extensive new No-Frost district as part of Homa's factory complex, a project that is near to completion in 2023. Throughout this growth, the core of Homa's business has always been a close understanding of our B2B



partners. The products we make for them embody their personalities and make their brands zing with life. Today more than ever, companies know that they must place the customer experience at the centre of the products they design and market. Today's consumers want stylish cooling products that optimise food preservation and storage, rather than just a box to keep food cold. They are also looking for appliances that are respectful of our planet. We at Homa rise to meet these needs of our partners and their customers through a focus on constant and innovative Research and Development to deliver beautifully designed and engineered original authentic products, all based around high energy efficiency standards and overall sustainability. And now we have also achieved true ODM status



#### PRODUCTION FACILITIES MAPPING

	Branch No.	Production Kick-off	Manufactured Products	Production Lines	Gross Floor Area (m²)
Α	Factory #1	2003	top mount, upright	2	106.000
в	Factory #2	2007	combi, top mount, small or middle size	2	34.000
С	Factory #3	2008	table top, small size	2	73.000
D	Factory #Component	2012		1	68.000
Е	Factory #5	2012	no-frost in general (combi, top-mount, multi door)	3	83.000
F	Factory #6	2015	no-frost side-by-side, big size	1	67.000
н	Factory #Chest Freezer	2015	chest freezer	2	75.000
G	Factory #7	2019	no-frost big size (top-mount, multi-door)	1	52.000
T	Homa Campus Total		/	/	33.000
J	Factory #CKD	2020		1	30.000
К	New No-Frost District				70.000

and are offering client brands our own take on the industry's state-of-the-art. In all these ways, we build value for our partners, encapsulating all this focus and effort in our corporate tag line "We take care of your dreams".

#### Our footprint and R&D focus

Our nine factories in Nantou have a footprint of around 600,000 sqm,

plus the 70,000 sqm of the soon-tobe finished No-Frost district. There are 10,000+ staff, 13 production lines and 130+ product platforms, covering top mount, upright, combi, table-top, no frost and multi-door refrigerators plus chest freezers, with two plants producing components and CKD. Production capacity is 50,000+ units per day and 15M+ units for 2023.

## Milestones of Homa production development production capacity: M Units



Our R&D team of over 200 experienced professionals in mechanical and electrical engineering, mechatronics, computer science, to name just a few, lead our ceaseless pursuit of innovation, while collaborating with a network of distinguished universities, research institutes and global partner companies to tap into the world's best technologies and practices. While continuing to seek incessantly for advanced technologies to improve people's daily lives, it is also our heartfelt belief that our R&D objective is no longer simply meeting technical specifications, but also satisfying consumers' expectations of the new trends around emotions, status and eating and shopping habits, as well as their concerns for the environment. Our close relationships with our B2B partners enable us to develop a deep understanding of these trends and others as they develop.

#### New solutions

And it is these collaborations with our B2B partners, as well as with suppliers, technical partners and University research organisations, that also help us gain a unique understanding of which technologies are significant and when they are mature enough to be most effectively used and become mainstream.

This is the case with No-Frost. No-Frost is substantially about having air constantly flowing around the cavity, managing humidity and preventing the formation of frost while at the same time ensuring even temperature levels throughout the appliance. This way, food lasts longer and in fresher conditions. We did not invent it, and it has been around for a while, but it has come a long way and is now ready for us to take it to the next level and systematically feature it across our entire range of products. Hence, our new No-Frost manufacturing district. We have also found a way to offset any potential energy consumption increase due to No-Frost with our Al inverter technology, applied to the compressor system of our refrigerators. Additionally, this technology helps avoid temperature fluctuations, maintaining a precise temperature inside the cavity. resulting in further energy savings and better preservation of food. Leading our other outstanding recent innovations is the proprietary MultiClimate SystemTM , by which different levels of temperature and humidity are achieved to preserve different foods in conditions that are best adapted to them and as close as possible to their natural environment. Other innovations are the "converter" box" in the refrigerator cavity that can reach temperatures below 0°C, more choice in organising the internal spaces, and new intuitive, precise user interface solutions.

With the timely introduction of leading-edge technology that can be immediately scaled to any dimension, we are offering our clients a key competitive advantage. A claim we can sustain because in our industry, size does matter, and our being specialised in cooling and at the same time having such a large production footprint further boosts our relative scale, and edge, over generalist players, and offers our clients compelling and competitive products in a record go-to-market timeframe.

#### Moving into the future

For the last three years, while the pandemic impacted the ability of our partners to visit our plants and see in person our offers, we have nonetheless been continuing to build on our strengths not just in the strategic expansion of our No-Frost platform. but in many other ways. Management, new staff training, a deepened design culture, more high-end product range, more digitisation and automation, additional quality processes, evolved approaches to partner service and to sustainability all underpin Homa's production vision: "Homa future production plants - smarter, faster,

cleaner, brighter, and greener". We demonstrate our care ethos in the recognition that a safe and pleasant working environment is essential for both staff and visitors. and the infrastructure surrounding the manufacturing site certainly ensures easy access to transportation. supermarkets, restaurants, and a bank. Onsite, the visitors' experience has recently been enhanced with the addition of a special product showroom and upgraded meeting rooms. Onsite, staff safety and comfort are taken extremely seriously. Annually, the month of June is dedicated to focused additional safety training and communication. Comfortable temperatures are maintained throughout thanks to a centralized cooling system in each factory. There is continuous treatment of Volatile Organic Compounds (VOC) to reduce harmful emissions, and fire sprinkler systems are in place. Overall investment in safety improvement equipment over the last 10 years has been over 5 million RMB.



## The future of intelligent manufacturing: a virtual tour of Homa manufacturing

Visiting our manufacturing site, everywhere you will be struck by the high levels of digital management, with our mass production MES system, and state of the art automation. Moving into the sheet extrusion area. it is fascinating to watch the highly automated twin-screw extruder, with fully automatic control of feeding and forming, easy operation, and fast transformation, resulting in stable and uniform plate thickness and surface brightness greater than 80 nit. Our Side Panel Forming Machine is fully automatic, handling cutting, rolling, condenser pipe sticking and U-shell bending all in one line. Given the great need for flexibility in our business model. our best-in-class machinerv enables us to shift quickly between different platforms. All this with high

dimension accuracy and stable quality, with a tolerance within 0.015mm, and high productivity, with 160pcs per hour.

Passing to the section dedicated to the production of vacuum formed cabinet liners, using machines constructed by our Italian partner Comi, you will be amazed by the speed and efficiency of the auxiliary hydraulic punching and shearing. At 115 units/hour, it is the fastest in the industry, providing a stable cabinet quality that also has the best-in-industry appearance.

#### The automated high performance

vacuum pump line will also impress you with its powerful vacuum pump working at 8 L/min. Vacuum timing stands at 15 minutes, with a vacuum degree of 12 Pa and an auto shut off system to retain the vacuum.

The cabinet assembly line conforms to the one-flow production mode of refrigerators, with line side auxiliary supporting automation equipment. The overall line speed is adjustable by frequency conversion, from 8-15s/m. Production capacity per shift is 3000 units.

On the dynamic cooling performance inspection line, you will once again have proof of our care for quality. Here the 45 minute fully computerized fast testing of the product provides high cooling detection efficiency and quick detection of abnormalities.

Robots are always a pleasure to watch with their precise, ultra-efficient



movements, and our carrying robot fulfils it role by reducing heavy labour for the workers while improving safety and handling efficiency, and reducing damage to the refrigerator as it is being moved.

A final stop in our virtual factory tour will take you to the auto

#### sealing and packing line.

Here, the automatic Programmable Logic Controller (PLC) manages automatic box pushing, automatic binding, automatic code scanning into the warehouse, as well as entering the box data into the system for counting. Automatic pressing of the box top can provide a tightness of 75kg.

#### Partnering for value

Homa's global scale and reach, the beautiful products we manufacture for our clients, our way of caring and of being part of our client's team, and our belief that people and relationships are the key ingredients to our success: this is what defines us. This is what guides us in every business decision we take every day. Yes, like everyone else, we are in business to create shareholder value, but we know that this requires satisfying stakeholders, starting with our clients and their customers. Value is therefore a natural consequence of our ability to deliver on our unique and different proposition.

We hope you have enjoyed this peek into the caring world of Homa, and we welcome the chance to get to know you better as you discover how we can add value to your business, through the diligence and imagination of our partnership possibilities!

## Sustainability in the factory

Having concluded our whistlestop virtual factory tour, it is important to come back to an acknowledgement of the fact that consumers around the globe are not just concerned about sustainability in terms of how much energy their appliances use, but also how sustainable the processes are in manufacturing those products, and they are less and less prepared to compromise. At Homa, we recognise how crucial this is, and you could say that the technology in our products and plants is conceived and validated under that perspective. In our vision, the purpose of technology is to serve the ideal of caring from a concrete. technical point of view.

Our ongoing work to make our plants highly sustainable spaces revolves around:

- Reducing energy consumption by reconfiguring our equipment energy management systems.
- Carrying out regular equipment maintenance to ensure the stable operation of the equipment, and maintaining stable processing quality to reduce manufacturing energy consumption.
- Reducing energy consumption through frequency conversion operations.
- Selecting new equipment according to new energy standards.
- Equipping areas of high energy consumption with automatic remote-control systems to reduce consumption.
- Installing LED energy-saving lighting and adopting local start-stop control.
- Installing photovoltaic power generation equipment.

# MASS CUSTOMISING COOLING PRODUCTS IN A PERSPECTIVE OF SUSTAINABLE MANUFACTURING

### An interview with Marco Taish Full Professor at Politecnico di Milano

Traditionally in manufacturing, there has been the need to reconcile two apparently opposing needs: large scale production and personalisation of the product. In the case of Homa, there is the added element of being an OEM, mainly producing white goods for third parties outside China, who sell them under their own brands. So these products must have at least a minimum of visual brand identity in order to stand out among the vast sea of white in the shops. Marco Taisch, a researcher and professor at Milan's Polytechnic, helps us gain precious academic insight into the matter.

#### How do we efficiently manage the needs of very large-scale production with the need to personalise the products?

The reconciliation of these two factors actually began in 1908 with the Ford T, and the effort to bring more and more customisation to products, while maintaining high production volumes. Then after the second World War mass customisation exploded. On the one hand, people's income increased, and the consumer was no longer content to have just any car of any type, any shape, as long as it was black! While on the other hand, that famous marketing



**Marco Taisch** is Full Professor at Politecnico di Milano, where he teaches Sustainable and Digital Manufacturing, and Operations Management.

He is one of the coordinators of the Manufacturing Group of the School of Management of Politecnico di Milano. During his academic career, he has been the Rector's delegate for Placement and Alumni, Director of the MBA and Executive MBA of MIP, the Business School of Politecnico di Milano. Since 2002, he has been particularly dedicated to the study of technological trends, carrying out some technological roadmaps and Technology Foresight studies on manufacturing as a consultant for the European Commission.

He is President of MADE – Competence Center Industria 4.0, the largest among the 8 Italian Competence Centers created by the Industry 4.0 National Plan.

He is President of MIICS – Made in Italy Circolare e Sostenibile, an association created within the framework of the Extended Partnership – PE 11 in the Italian Recovery and Resilience National Plan which coordinates and leads the activities of the 25 partners (universities and companies) that take part in the Extended Partnership.

He is co-founder and Scientific Chairman of the World Manufacturing Foundation, which yearly organizes the World Manufacturing Forum, the global event that defines the Manufacturing agenda and which is endorsed by the European Commission.

He is Vice-president of EFFRA (European Factories of the Future Research Association), member of the Board of Cluster Italiano Fabbrica Intelligente and of member of the Cluster Lombardo Fabbrica Intelligente.

He took part in the Advisory Board of the Italian Industry 4.0 Plan, coordinated by the Ministry of Economic Development (Former Minister Carlo Calenda) and he supported the Lombardy Region in defining the industrial and reshoring policies under the commission of the then Lombardy Region's President Roberto Maroni.

He was founding partner of Holonix, a spin-off of Politecnico di Milano, which he exited in 2017 to create, in March 2018, Miraitek4.0, another spin-off of Politecnico di Milano, whose activity concentrates on Industry 4.0.

He is currently a member of the Unicredit Territorial Advisory Board for the Lombardy Region.

He currently works as a consultant for different companies such as Leonardo or Thales Alenia Space; for these companies he has developed, together with a team, projects aimed to improve digitalization and production processes. "

Consumers today aren't only sensitive towards price, but also to a hyper personalisation

slogan in fact disguised the production requirement to keep costs to a minimum, with a higher sale price based on customisation balanced with extreme production standardisation.

Today, there are various factors to take into consideration. First, consumers today aren't only sensitive towards price, but also to a hyper personalisation. What do I mean by that? It means that a product has to meet the needs of an individual, rather than a group or segment of consumers. So how do we manage the needs of cost-efficient standardised production and such specific consumer needs? Well, unlike in the past, we have moved

on from the matter of volumes. Whether a factory produces 100 pieces or 1000 pieces, thanks to the advances in production systems, there is a high level of flexibility. Basically, manufacturing technology and digital technology are now the same, allowing us extremely high levels of customisation and personalisation. So in fact the need to reconcile these two factors is hardly a problem anymore. The problem existed when there was inflexibility in the production system, when passing from one model or variation to another meant you had to intervene with tools or with factory configurations that were inevitably physical or mechanical. For example, you'd have to change the machine press, or manually change the machine settings. Today, all these configurations are managed via software, and so take zero time. Another factor is the ability of the very talented designers who can generate personalisation with perhaps a little sleight of hand magic for the consumer.

What I'm talking about is the concept of perceived personalisation. The hidden part of the product is highly standardised, but if I go on the website of a white goods manufacturer, I see 45 different models of refrigerator. I'm in the process of doing up my house, so am currently immersed in this. I know that there are maybe a limited number of basic configurations, but last-minute software interventions provide a host of apparently different models.

#### And how much has this standardisation of products, been influenced by the automotive industry, who use the concept of the standardised 'platform'?

Very much so. The automotive industry calls it a 'platform', in other industries they use other terms. In kitchen design for example, it's called module standardisation. If you look at the catalogues of the big-name kitchen specialists you'll see reference to 60 cm, 45 cm, 30 cm modules. And very interestingly, there's a huge work of standardisation in kitchen provision that in many cases has emerged in an unplanned way. While in the car market each individual manufacturer has said, "I'll create my own platform that will help me to make the most vehicles in my range", in the kitchen market, standardisation has emerged from the bottom up. With kitchen furniture modules of 60cm, 45cm, 30cm, you have to install an appliance of those dimensions, and it's not as if the white goods manufacturers and the kitchen manufacturers got together and agreed on this, it emerged by itself. So ultimately the concept is to modularise the product as much as possible and play around with all the different possibilities.

#### How does the need for hyper personalisation impact manufacturers who operate on a very large scale?

Chinese producers, like all manufacturers around the globe, are facing a huge change in consumer expectations which in many cases have become more extreme post-Covid. Young people are driving this, but all demographics are affected.

The first factor as mentioned above is hyper personalisation. This already

existed for 10 or 20 years before Covid, but has become more accentuated every year. If you think about young people today and the market for trainers, they absolutely take for granted that they can go on to their favourite brand's website and customise a pair of shoes. This is not now seen as value added but as a market necessity that goes without saying. You offer a range of products that are extremely customisable or you're out of business.

The second requirement which is much more noticeable now, is very reduced delivery times. During lockdown, the only way to have products at home was via e-commerce. Many people who before lockdown had not used e-commerce now had no choice, and discovered that they could receive practically anything in 24 hours. Once Covid was over, this experience changed their purchase processes. Although they could return now physically to the shops, they continued to buy online. What does this experience say to me as a consumer? It says: "Everything, immediately!" So today, you provide fast delivery times, or you have problems. What China is doing to tackle these requirements is building ways to get closer to the markets they serve, through partnerships and investments.

#### Are there any other factors that are affecting the efficient and fast delivery of goods on a global scale?

Absolutely. Think about how globalised logistics worked until recently. It was the spinal system of the world, and it worked perfectly. Then came Covid, lockdowns. blocked ports, ships obstructing the Suez Canal, and we discovered that logistics isn't as reliable as we thought. So large manufacturers need to be thinking about how to ensure that global logistics work, avoiding bottlenecks. There needs to be a rapid increase in the production and provision of containers, and longer-term investment in the expansion of ports' capacity. In fact, in the specific case of Homa, I believe they started 20 years ago to invest in and partner with the Chinese ports to guarantee the free flow of their traffic towards the rest of the world

# "

Future decisions for companies and manufacturers will have to tap into the behaviour of young people: every choice is based on information gathering before decision-making.

> Marco Taish Full Professor at Politecnico di Milano

#### What are the emerging technologies today that can help improve quality and efficiency in production?

The same ones we've been seeing for the last 10 years, under the umbrella of Industry 4.0. big data, cloud computing, 5G. 5G private networks, for example, are very important. Enabling the flow of large amounts of data via 5G means we can control machines remotely which we're unable to do with 4G, because currently to control a robot with 4G you need a cable.

Blockchain is used a lot in the world of finance, whereas in factories currently I don't see it a great deal.

As long as the consumer continues to trust the brand as a guarantee of quality, the watertight assurance of blockchain isn't yet needed in this world.

#### What are the main challenges for domestic refrigerators in the next 10 years and how can we overcome them?

If we're looking at the next 10 years we have to consider the outlook and expectations of today's children and teenagers who will grow up over that decade. We've already looked at reduced delivery times. Today young people make no distinction between buying a T-shirt or a fridge or a car. They want it tomorrow morning. When I told my 4 years old daughter the disappointing news that our new car would be delivered in 4 months' time, so we would have to go on holiday in the old one, she said "Daddy, go on Amazon and they'll send it to you tomorrow mornina!" This is the consumer of tomorrow. Buving habits are changing. People don't plan any more. In the past, we went shopping at the supermarket on Saturday afternoon with a list for everything we needed for the week. We don't do that now. We know we can go online to our favourite website or our local supermarket who can deliver the stuff in 2 hours. Mid-afternoon we can ask ourselves what we want to eat tonight because we know we can order it and it will be delivered to the office before we go home at 6.00pm. So we hardly plan, because we know everything is available. A second important point is that

youngsters are not just 'digital natives' but 'sustainable natives'. You can sell me an A class refrigerator with low energy usage, but this is no longer enough. You must guarantee that it comes from an A class factory, that it has a low impact on the environment. And young people today have an awareness of the life cycle of the product. You can't content them by saying this has low consumption because immediately their next question is about recycling and green production. They want guarantees on this.

#### Is the environmental impact of the production phase significantly lower than that of energy consumption and disposal?

Absolutely. In the automotive industry, it's around 30% on the production side and 70% in usage. In white goods, it's around 5-10% in production and 90-95% during usage and disposal.

# What about greenwashing, do young people trust companies, brands?

No, they don't trust them. They have an innate awareness deriving from their

digital knowledge. There is of course a dilemma and a challenge here. They do tend to trust information that they find online. But there is a crucial question: is what they find online true, reliable? In this case, possibly blockchain could become the answer, providing a way to reliably navigate this mass of more or less verifiable online information. Future decisions for companies and manufacturers will have to tap into the behaviour of these young people. If you study their behaviour, choices and decisions, everything is based on information gathering before decisionmaking. They ask themselves. "What shall I do today?", and then they visit their favourite sites and make a decision. based on what they see there. So in our case, the subject of monitoring data, information, the factory, energy consumption, is fundamental. Of course they don't go to China and do an audit of the factory, that's where businesses will be created that monitor and certify the energy use of the refrigerator or the energy consumption in the factory.

# HOMA'S DEDICATION TO QUALITY AND CUSTOMER SATISFACTION

### An interview with Yunlan Liu General Manager of Quality at Homa

#### How did you decide to join Homa? And how do you see your role contributing to Homa's vision?

I first worked for Hisense Kelon in the quality area for 22 years. I then joined Homa in 2015, I already knew a number of Homa's leaders from being in the industry for such a long time, and I really appreciated Homa's quality control approach.

I joined Homa at a key moment when the company was working to upscale, and at the same time putting a great effort into quality improvement. Such an effort obviously puts huge pressure on the whole quality team to meet those requirements. We set out our plans, and implemented them step by step. It's been a tough process, but after these past seven or eight years, I can say that Homa is now recognised for having good stable quality in the industry, especially in our high-end range.

Thanks to all our hard work, our customers truly appreciate the improvements we've made over recent years.

#### How do you ensure that clients' feedback is taken into account and is used to improve quality? How does that process work?

Firstly, at Homa we have a special control team that connects our quality and our clients. This team receives complaints and other feedback from the clients. Second, we have a very specific and important annual process targeting quality improvement, through discussion and training. This process is at a company level, involving not just the quality department, but all the plants, the sales departments, and many others. The outcome of this process is the quality improvement plan for the following year.

But what happens if we receive a complaint from a client? We have a very strict process to follow, with a time limit for when the improvement must be made, it could be three months for example, and how that will be carried out. Once we have made the improvement, we pass this information back to the client, asking for their feedback, their level of satisfaction,



Native of the Hunan province. Graduated at Wuhan Textile College. Moved to Shunde with her husband in 1992. She worked for Kelon, which was later bought by Hisense, for a total of 22 years. She joined Homa in 2015. and so on. And lastly, we continue to pay attention to the specific issue or complaint, proactively researching the market to see if there are similar complaints, or related product improvement advice.

An extremely important point is the customer-centred attitude that we foster throughout the whole company. Our focus here is on understanding our products in the markets, which problems happen frequently, and what is the most concerning quality problem for our customers. This customercentred focus gives us the chance to really standardise our quality systems and awareness across the whole company.

#### How do you track and analyse data, other than customer feedback, to identify areas for improvement in the manufacturing process?

Our Manufacturing Execution System (MES) provides us with an excellent overview of the data in our manufacturing processes. An MES is a comprehensive, dynamic software system that monitors, tracks, documents, and controls the process of manufacturing goods from raw materials to finished products. Responsibility for our MES lies with our IT department, and has been a crucial step in our processes of digitization and automation at Homa. Thanks to individual QR codes, via MES we can follow the journey of a product or part through the whole system. We use it to track and test our spare parts, and at important quality control points. MES is a great tool for working together with client feedback from the market to make manufacturing improvements. When we receive client feedback identifying a problem, with MES we can identify exactly where in the process the problem has arisen, and at a higher level, we can use this process to identify the top 5 problems that arise. For example, what if there is a problem with a compressor in a refrigerator? We can scan the product and by reading the parts code, we can identify where in our process the problem lies, and who the supplier is. In this way, we can

# "

# This customer-centred focus gives us the chance to really standardise our quality systems and awareness across the whole company.

Yunlan Liu General Manager of Quality at Homa "

### Our company's base line policy is always quality first.

analyse all the relevant data on a large or a small scale.

Supplementing the MES, there are cameras along the production lines at various process points, so if something stops the line, there are alarms to provide feedback and quick intervention, ensuring high standards of quality and efficiency.

#### How do you establish strong relationships with other departments In Homa to ensure quality standards are applied, met and improved throughout the organization?

First of all, training for employees in all departments is very important to ensure a standard concept of quality throughout the company. In addition to this, there is also technical skills training for people from our different factories. Secondly, we have a monthly meeting with the directors of each department at which we share information on product performance in the market using clients' feedback, including any serious problems they find. This way, the directors are constantly updated on what needs to change and what can be bettered. Thirdly, we issue a constant stream of communication to all departments based on our clients' feedback, so everyone is kept fully informed and updated. Fourth, if a problem arises concerning a specific problem, a special meeting is called outside the regular schedules to deal with the topic immediately. And last but not least, there is an audit system throughout the factories which is very important to evaluate whether a factory or department is meeting the quality standards and processes of the company.

# How do you balance the need for quality with the need for speed and

#### efficiency in the production process?

Our company's base line policy is always quality first. Of course we need to produce high-end quality products in a short time, but we set an agreement with other departments with a fixed baseline for quality. We cannot compromise against time and efficiency. Based on the agreement we make with the relevant department, we monitor whether the manufacturing process really meets the terms of this agreement, or whether in the actual process, anything changes

# Are there any other points you would like to make about quality at Homa?

I'd like to emphasise that even as Homa has grown bigger and bigger over the last 20 years, everyone from the head of the organization to the employees in all parts of the factories agrees on the importance of quality, because only in this way can we keep our clients. Quality is what is important for them. Our hard work in this area helps us to make constant improvements, proved by the fact that over the 20 years of our life, the complaint and repair rate has decreased by 60-70%. And we're proud to say that our customers tell us that Homa leads in quality.

#### Can you tell us your perspective of being a woman in such a significant job in a Chinese company grown to international importance?

This is traditionally an industry with a majority of men in technical leadership positions, while Homa is rather different, with quite a high number of female leaders.

I think that women may bring more care and consideration to their work, with an ability to stand in other people's shoes that helps to build relationships. In my job, I don't only have to manage my own department, but I have to work with many others. This means being persuasive and also strong, because that is necessary to insist on the application of quality rules and standards across departments. It's not an easy job, but as a woman I have found that I can meet the demands needed when I have to!

# CRYPTOMANUFACTURING 5.0

Blockchain technology can bring significant benefits to industrial companies. It provides greater transparency into complex supply chains where delays and sourcing constraints impact production and profitability.


### BLOCKCHAIN HAS THE POTENTIAL TO OFFER EFFICIENCIES AND IMPROVEMENTS IN MANY OF THE FOLLOWING AREAS:

### Supply-chain monitoring

for greater transparency into complex supply chains where delays and sourcing constraints impact production and profitability

**Identity management** for when it is important to know who is taking an action and what their credentials are, including attorneys, auditors, engineers and technicians

**Asset tracking** to monitor equipment movements or intermodal logistics across carriers

**Quality assurance** that can look across a production life cycle to gauge qualifications, quality, patterns of defects, etc.

**Engineering design for longduration,** high-complexity products, for which delays in sharing updated engineering specifications or parts can increase rework and delay final delivery. **Regulatory compliance** enhanced by indelible records of actions taken, assets' movements evidenced by permissioned consensus.

**Materials provenance** and counterfeit detection to reduce the \$4.2 trillion impact of counterfeiting and piracy on the global economy by 2022, as cited by World Trademark Review

### **Blockchain-powered solutions**

can bring together all of this information, delivering significant value for industrial companies, and can also help unlock the full potential of other advanced technologies like augmented reality, Internet of Things (IoT) and 3D printing



### Smart contracts

Many of these functions can be automated through smart contracts, in which lines of computer code use data from the blockchain to verify when contractual obligations have been met and payments can be issued. Smart contracts can be programmed to assess the status of a transaction and automatically take actions such as releasing a payment, recording ledger entries, and flagging exceptions in need of manual intervention.

### Traceability

If a company discovers a faulty product, the blockchain enables the firm and its supply chain partners to trace the product, identify all suppliers involved with it, identify production and shipment batches associated with it, and efficiently recall it.

### Accounts payable

Blockchain can improve accuracy and efficiency in accounts payable management, an elaborate process that involves invoicing, reconciling invoices against purchase orders, keeping track of terms and payments, and conducting reviews and approvals at each step. Even though Enterprise Resource Planning (ERP) systems have increased automation in these areas in recent years considerable manual intervention is still needed. And since neither of the transacting firms has complete information, conflicts often arise.

### **Cross-border trade**

Cross-border trade involves manual processes, physical documents, many intermediaries, and multiple checks and verifications at ports of entry and exit. Transactions are slow, costly, and plagued by low visibility into the status of shipments. Blockchain can increase transparency, verification and speed of processing throughout the chain of events.

### DEFINING BLOCKCHAIN

Blockchain is best known as the secure digital system behind bitcoin, the digital currency that operates independently of a central bank. Blockchain works as a distributed, or decentralised ledger, a digital system that records transactions among multiple parties in a verifiable, tamperproof way. Rather than being held in a single, centralised location, the blockchain is held by all the users in a network. While its use outside the finance world is still in the exploratory and developmental stages. manufacturing players are recognising that many elements of blockchain may be integrated into their operations to improve efficiency, security and transparency. To understand why this is, let's look more closely as how a blockchain works.

#### How blockchain works

In general, all the users in the network, also known as network nodes, have copies of the same ledger. Transactions on a blockchain do not have to be financial-they simply represent a change in state for whichever data point the blockchain's stakeholders want to track. A blockchain is valuable partly because it

comprises a chronological string of blocks integrating all three types of activities in a supply chain: information, inventory and financial, capturing details that are not recorded in a traditional financial-ledger system. Moreover, each block is encrypted and distributed to all participants, who maintain their own copies of the blockchain. Thanks to these features, the blockchain provides a complete, trustworthy, and tamperproof audit trail. When blockchain record keeping is used. assets such as units of inventory, orders, loans, and bills of lading are given unique identifiers. which serve as digital tokens. Additionally, participants in the blockchain are given unique identifiers, or digital signatures, which they use to sign the blocks they add to the blockchain. Every step of the transaction is then recorded on the blockchain as a transfer of the corresponding token from one participant to another. Since participants have their own individual copies of the blockchain, each party can review the status of a transaction, identify errors, and hold counterparties responsible for their actions. No participant can overwrite past data because doing so would entail having to rewrite all subsequent blocks on all shared copies of the blockchain.



# How can blockchain in industry work in practice?

Simple blockchains can work well internally for a large manufacturer, by coordinating across its multiple internal ERP systems. When setting up a blockchain to manage supply chains with external partners, the partner companies have to take into consideration the security of their own data. One solution would be for the companies in guestion to agree to centralize their data on production and inventory-allocation decisions in a common repository. But this would require a huge level of integration. All involved companies would have to trust the others with their data and accept centralized decisions. regardless of whether they are partners or competitors, a solution that few would accept.

A more practical solution is for participating companies to share their inventory flows on a blockchain and allow each company to make its own decisions, using common, complete information. Part of the appeal of using blockchain to enhance supply chain efficiency and speed is that these applications, much like those for improving traceability, require participating companies to share only limited data—in this case, just inventory or shipment data.

# Limitations, dangers and solutions when using blockchain

### It lacks speed for storage and retrieval

It's important to note that the encrypted linked list or chainlike data structure of a blockchain is not suited for fast storage and retrieval—or even efficient storage. And each link in the chain requires approval from all network partners before the step can be completed.

So a blockchain would not replace the broad range of transaction-processing, accounting, and management-control functions performed by ERP systems, such as invoicing, payment, and reporting. Instead, the blockchain would interface with legacy systems across participating firms. Each firm would generate blocks of transactions from its internal ERP system and add them to the blockchain. This would make it easy to integrate various flows of transactions across firms.

#### Human error and malicious behaviour

Even when a blockchain record is secure, there is still the danger that a contaminated or counterfeit product might be tagged and introduced into the supply chain, either in error or by a corrupt actor. Another danger is inaccurate inventory data resulting from mistakes in scanning, tagging, and data entry.

Companies are addressing these risks in three ways. First, they are stringently conducting physical audits when products first enter the supply chain to ensure that shipments match blockchain records. Second, they are building distributed applications, called dApps, that track products throughout the supply chain, check data integrity, and communicate with the blockchain to prevent errors and deception. If a counterfeit or an error is detected, it can be traced to its source using the blockchain trail of the transactions for that asset. Third, companies are making the blockchain more robust by using IoT devices and sensors to automatically scan products and add records to the blockchain without human intervention.

#### Best practices for blockchain solutions

Blockchain solutions can create value for industrial companies in all the ways discussed above. But that does not mean that is the right solution for all companies and industrial manufacturing sectors. By focusing on four key areas early in their blockchain efforts, companies can set themselves on a path toward successful execution.

#### Make the business case

Blockchain needs to be a strategic fit. When there's a need for different parties to share and update data, when time is of the essence and trust between parties is needed but intermediaries add too much complexity, then blockchain-based

# TRACEABILITY AND TRANSPARENCY USING BLOCKCHAIN IN THE AIRCRAFT INDUSTRY

Today's commercial aircraft can have hundreds of thousands or even millions of parts. Blockchain can give airframers, airlines and suppliers the level of transparency they need.



solutions can be very effective. But if none or only one or two of those types of challenges are present, then other solutions may be better placed.

### Build an ecosystem

Bringing together a group of stakeholders to collectively agree on a set of standards that will define the business model is perhaps the biggest challenge in blockchain. Participants have to decide the rules for participation, how to ensure that costs and benefits are fairly shared, what risk and control framework can be used to address the shared architecture, and what governance mechanisms are in place, including continuous auditing and validation, to ensure that the blockchain functions as designed.

### CARMAKERS MASSIVE AND COMPLEX SUPPLY CHAINS.

Raw materials are fashioned into individual components, which are assembled into larger systems that are ultimately assembled as automobiles. But. while auto manufacturers are ultimately accountable vehicles' reliability and safety, they can lack sufficient visibility into the provenance of the vehicles' parts and their journey from the mine to the showroom floor. A blockchain-enabled solution would help automakers to track every step of that them determine the cause, whether it be poor-quality steel, the work of one of their suppliers, or an issue in their own plant. When combined with connected sensors powered system could even record the conditions a shipment of components faced aboard a train or container ship. That would provide a clue that rough seas or poorly controlled temperatures could have caused damage. Because the companies that make up an automotive supply chain form an interdependent web, it could be beneficial for all stakeholders to have some visibility into the disposition of products. That can be difficult when the information is stored in multiple, incompatible systems.

#### **Design deliberately**

Much consideration must be given to a blockchain's design. Will it be permissionless, allowing anyone to initiate and view transactions, or permissioned, restricting access to certain parties? No matter which model is chosen, it's important to include cybersecurity, compliance, audit and legal specialists in important design decisions from the beginning.

# Navigate and seek to shape regulatory uncertainty

Regulators, elected officials and industry groups around the world are still evaluating potential responses to the increasing prevalence of blockchain enabled solutions. It is important to engage with these players, to make the case that blockchain technology can be trusted. Blockchain's potential for transparency, as well as the immutable record it creates, could make it a powerful tool for regulators.

### Conclusions

As blockchain is integrated more and



more into the factories and supply chains of the future, the improvements in speed of processes, accuracy and traceability of data, quality control and security all have the potential to impact on staff levels and working practices. While automation, aided by blockchain, may reduce the necessity for worker numbers in certain roles, the need for highly skilled staff to manage the digitised processes will increase. Additionally, in many cases, blockchain is an aid to efficiency, not a replacement for necessary human intervention, which will be required in the foreseeable future for tasks such as auditing and essential communication between partners.

# QUALITY IN THE EYE OF THE BEHOLDER

An interview with Silvia Torretta, Studio Volpi Technology Director



# What is your definition of quality in refrigerators?

Let's start with a few words on the basic and expected quality in today's refrigerators. I would say that the first quality parameter of any home appliance is durability. When someone buys a refrigerator, they want to know that it will last reliably for a good number of years. For everyday use, the door must open well, the handle should be robust, the appliance must not make too much noise, in summer it needs to continue to keep food cold. Refrigerators today are not niche products – high performance standards are expected and taken for granted.



The quality of associated services and accessories is also an important factor. The consumer requires that replacement filters, shelves or baskets will be easily available and will not soon disappear through obsolescence.

For the non-visible parts of a refrigerator, quality perception does not become a factor until something goes wrong. For example, usually, the consumer does not even think about the door seal until it detaches and no longer fulfils its function. In such a case, ease of parts replacement and rapid effective service intervention makes a huge difference in salvaging the customer's perception of quality and value.

And what are your ideas beyond these very basic elements of quality? Give us a more general overview of the idea of quality from the company's perspective versus the consumer's perception of quality?

I think the most interesting concept of quality today is where there may be a discrepancy between the company's investment in quality in the production processes, and the way the quality of the finished product is perceived by the consumer. The company may invest in high quality, high cost materials and processes to produce what they consider to be a very high quality product, but many of these processes or materials may be invisible to the consumer, who then perceives that product to be of a similar quality to another in which the company has invested less. This discrepancy in perception becomes important when we connect it to the cost of production. For example, we have recently been working with a company whose specific role is the costing of products, evaluating quality efficiency in production compared to related costs. They break down the costs of a product and make visible the percentage invested in elements that have a direct effect on the consumer's perceived quality, compared to the percentage of investment made in elements that are not perceived by the consumer. This investigation begins by looking at consumer pinpoints, using various sources such as consumer.

publications, online reviews and so on. From this they map out the strengths and weaknesses of the product, and then analyse its physical structure and break down the cost of its single components. They then weigh these costs against the consumer's perceived quality of the product.

### In the field of refrigerators, what are the elements of perceived quality? Where should we work to improve perceived quality?

One area I would focus on is the authenticity of materials. For example, the difference between the use of



real metal and plastic with a metallic coating, gives a completely different touch sensation. The functionality may be exactly the same, but the genuine material will lead to a completely different consumer perception. So, anywhere there is the congruence between appearance and reality raises quality perception.

With the touchpoints where the user interacts with the product, attention to detail is important for raising quality perception, for example, on the handle where the user will experience various touch sensations, rather than the seals which are not really visible to the user, and with which they have no interaction. And of course, perceived quality involves all the senses, so for example in the case of a refrigerator, the noise of the motor. the noise the door makes when opened and its weight, are considerations. A user may not even be aware of such factors, but all the sense elements. conscious and unconscious, are important in building up a sensation of perceived quality. So overall, perceived quality derives from everything about a product

that speaks of industrial craftsmanship and excellence in execution. For example, an unusual aesthetic detail that is not functional, but that demonstrates to the consumer that it was made with thought and care, can elevate the product above the average in quality perception.

On the other hand, an interesting additional point regarding consumer sensibility today is that with growing sustainability awareness, the consumer can sometimes see extra embellishments of the product as a negative because of the environmental cost of their production. This is a change from a few years ago when across the board, addons, costly materials and showy finishes added value: now, yes, consumers will pay for high quality materials and design, but in a more visibly rational and environmentally sound way. When thinking about this, we should be aware that in many cases, quality perception does not mean the elimination of small aesthetic errors such as slightly rough finishes or slight misalignments due to manufacturing

### DO YOU EXPECT RETAILERS AND BRANDS TO BECOME MORE SUSTAINABLE?



Source: https://www.firstinsight.com

tools and processes, but rather of finding ways to elegantly disguise the errors as a more cost-effective solution. In the refrigeration industry the cost of reducing errors to zero is not feasible or realistic.

However, companies work hard and invest in the best results possible. For

example, I know that Homa has invested in high quality presses and builds-in the cost of more waste to ensure a neat and pleasing finish to the edges and corners of their refrigerators. For them, this is seen as a worthwhile investment for the higher quality perception achieved. An interesting case in point around high levels of industrial craftsmanship and perceived quality are Dyson products, which ironically can also be considered through a negative lens. This contradiction is due to some peculiarities of their design. There are many elements of their design visible to the consumer that demonstrate high levels of craftsmanship and investment, with great attention to detail in comparison with an average product, while on the other hand, there are many internal elements of very high quality and cost that are not visible. It could be argued that the same functional result could be achieved by using cheaper components, but as Dyson occupies a notably high price point, they cannot take this path, so in their design process there is less focus on margins as they

make their technological choices. However, some may argue that using such costly invisible products makes little economic sense.

### Do you think there are cultural difference in perceived quality in different markets round the world?

Absolutely yes. It's mainly an aesthetic difference related to familiarity with the different materials used, the shapes that





are familiar. For example, if it is common to use a pan of a particular shape or material in one part of the world, people in that culture are more likely to give that shape or material a higher perceived quality. People will respond positively to the materials, processes, shapes that they are used to. So it's important to be aware of differing cultural parameters and to adapt products to meet these for different markets.

## Are there universal parameters of quality, including aesthetics?

Basically everything that appears as well thought-through communicates quality. Even if a product does not appeal very much to someone, if it demonstrates that there has been care in the process design and finish, the consumer perceives quality. On the other hand, elements such as misalignment, lack of harmony, variability in elements of a product over time, all impact universally across cultures on perceived quality.

### So apart from the basic expectations we discussed above, what do you think are the quality parameters of a refrigerator?

First, I would say quality is conferred by the elements of a product that do not change or become obsolete over time. So for example, any elements of interface or materials that are timeless are synonymous with quality. Then technological standards are an important quality parameter. Take the example of mobile phones, we're all used to taking the latest generation phones as the technological standard to measure everything against, even when looking at completely different sectors, so anything that falls below that technological standard is automatically seen as of lesser quality.

Once again, I would emphasise the importance of authenticity of materials. The consumer does not want to see that there is something of lesser quality behind what they see on the surface. For example, a visibly low-quality coating assuming the appearance of a higher quality material lowers quality perception even if the part is wholly functional. Another element I think is important is the way the product works once you move beyond its appearance. Once the user starts to interact with the product. makes demands on it, it has to prove its quality through intuitiveness and ease of use, the impossibility of using it

incorrectly. These elements derive from high-level design as an investment in true quality.

### Does the industry constantly have to introduce advanced and innovative technological functions, or is it enough to have technology that 'does the job'?

No, there isn't a direct connection between the technological level and perceived quality. In fact when introducing new technologies, companies must remember that today people are used to rapid technological advances, and most are not early adopters. There's an awareness among consumers that in the early stages of new technological solutions there will be a phase of adaptation and consolidation before they stabilise. Even with products employing very simple technology, it's possible to evoke high levels of perceived quality.

Can the topic of environment impact on quality? I'm thinking of a refrigerator that uses less energy, or environment sensitive production processes, or

## recyclable materials: are these elements of quality, or is that for the future?

Yes, I think all these factors are seen as a plus. They give the idea that the product design goes above and beyond simple functionality. In general, we are still in a phase where sustainability in industry is often just greenwashing and has little substance, so when a consumer does find real substance around environmental sustainability, they take note. Where a refrigerator truly uses less energy, this is a guarantee of quality because it's verifiable.

In fact, the home appliance sector is perhaps more mature in this regard, because energy labelling and so on is already well established, whereas for most other products, even if they are innovative, environmental concerns tend to be secondary. When we see advanced environmental credentials on a product, we are aware that it has been developed with a 360° perspective as a choice, and not just because of regulatory requirements, even when that choice may involve higher design and production costs.

### What are the tools, methodologies and processes that companies today have at their disposal to guarantee improved quality?

There are too many quality measurement tools to mention here, spanning those used in traceability of raw materials, through design to all the production processes. During production, quality interventions should be as simplified as possible, and not add further complications by generating reams of paper. For the consumer, they should result in a product that is easy to use, reducing variability and the chance of human error.

### What are future trends in quality?

One concrete trend that I see is the move to digitalisation which is also reaching into quality processes, for example the use of Artificial Intelligence and other advanced digital systems to do quality control work. This really does simplify and speed up processes, and lowers costs for the company by reducing the need to go back and correct errors.

# And in the future what will be perceived as quality?

I come back to the idea of perceived quality within a high level of industrialisation, where value is added by the consumer being very aware of the intellectual groundwork and expertise that has gone into the development of the product. For example, we have recently been looking at the refrigeration sector and the making of ice-cream. This does not mean making it at the artisan level, but it still brings in added quality perception because there has been a deep dive into what ice-cream making involves, which characteristics of the process and end-product we should retain, really focusing on what the consumer wants and how to achieve what they perceive as quality. So while of course a certain focus will always be toward the competitive needs of the market through constant controls of the industrialisation processes and balancing costs, this will be secondary to generating value through close examination and implementation of what consumers want.

### Are there any final points you would like to make about quality?

Well. I'd like to underline that for me quality always means a realistic compromise between a series of parameters such as the consumer's perceived quality, the production cost, the environmental cost, the visible brand value. Different parties have different expectations. Procurement will want to pay the minimum for materials and receive those materials rapidly and cost-effectively. Designers may want to use costly materials and parts while these may not add value for the brand in increased consumer quality perception. Manufacturers have to balance the cost of meeting regulatory environment requirements with production costs. The consumer will want an efficient product that lasts, looks good and meets their price expectations. All these elements and more must be balanced for a relative and realistic quality solution.

# NEW-NORMAL'S NEW DEAL IN HR

The work landscape in 2023 is tumultuous, with leaders and HR departments scrambling to manage the trends that have emerged from or been intensified by the disruptions caused by Covid 19.

In all business areas, organisations continue to face significant employment challenges. They are seeing a workforce that has different expectations post Covid 19, leading to pressure on how and when employees want to work, which feeds into the prevailing competitive talent panorama. This workforce needs different kinds of support around welfare and training than before the pandemic, areas where leaders and managers may not be well prepared to intervene, thus risking further talent attrition. And these challenges are taking place at a moment when the pressure to control costs is very high, and where advances in digitisation, artificial intelligence and automated processes continue apace, bringing both advantages and hurdles to be overcome.

Let's take a more in-depth look at these trends in general, and then examine more closely how they are specifically affecting the manufacturing sector.

### Workforce gaps

There is some debate about whether the 'Quiet Quitting' movement is a real phenomenon or a trendy phrase invented by the media and social commentators. In Quiet Quitting, the worker does not leave their job, but does the minimum required to get it done, including not engaging outside work hours. This label may in fact be a recent interpretation of a trend already in existence before Covid of worker dissatisfaction which was then exacerbated by the pandemic, as many employees reassessed their lives and their relationship to work.

There is no doubt, however, about the other phenomenon related to this radical reassessment by workers, 'The Great Resignation', which has been a major contributor to the large number of unfilled roles. A term coined in May 2021, The Great Resignation describes the record number of people leaving their jobs since the beginning of the pandemic. Some took early retirement, while many readjusted their ideas of how they wanted their personal and work lives to intersect and made major changes to how they earned their living. Even for those who remained in their jobs, and whose roles enabled them to continue to work remotely, the experience of home working convinced many that they did not wish to return to working in the office full time or even at all.

A March 2022 survey by PwC, Global Workforce Hopes and Fears, carried out on more than 52.000 workers in 44



countries and territories, found that while pay was still the main factor in why people want to change jobs, fulfilment and the ability to be one's true self at work were ranked second and third among employees considering a job change, with work flexibility also

### MEANING MATTERS TO EMPLOYEES

Most important factors when considering a change in work environment, % of respondents\*



\*Respondents who selected extremely or very important.

Source: PwC's 2022 Global Workforce Hopes and Fears Survey of 52,195 workers across 44 countries and territories

of increasing importance.

These changing expectations, which in 2023 have expanded and seem to be here to stay, are putting pressure on leaders and managers to find ways to manage the apparent disconnect between what employees want and traditional pre-pandemic work patterns. In the PwC survey, 26% of employees said they would prefer

full-time remote working, but only 18% said their employer was likely to adopt that model, while another 18% said their employer is likely to require fulltime in-person work, which just 11% of employees preferred. Also supporting this view of a disconnect between employees and executives was a November 2021 survey by Gartner of



more than 3,500 employees revealing that less than half believed remote working was de-stigmatized at their organizations, while 70% believed onsite workers were more likely to be promoted and paid more compared to remote workers. The Gartner Survey also found that the consequences of this clash of expectations were serious: 52% of employees stated that work policies would impact on whether they stay at their organisations, with 16% willing to auit their current job if required to work fully on-site, and 8% saying they would guit if required to work even partially on-site.

## Supporting employees for sustainable performance

In the face of these huge changes, leaders are rating company culture as their biggest concern regarding inoffice and work-from-home policies, and are working with HR leaders to manage the difficult challenges of adjusting their current culture to be supportive of the workforce. Full or part-time home working has increased the pressure on low to midlevel managers because these people are the colleagues with whom their direct reports most regularly interact. In a Gartner report on future work trends, 60% of hybrid home and office employees said their direct manager was their most direct connection to company culture. These managers urgently need support and training to update their managerial skills in line with today's needs, ensuring that they are clear about their priorities and how to practically implement corporate strategy in their day-to-day dealings with their reports.

Two areas that have changed postpandemic, where organisations are finding a need to take proactive employee measures to help support and retain talent, are wellbeing and supporting Generation Z new hires. Many people's mental health has been impacted by the pandemic, so employers are finding that they need to provide more opportunities for open discussion and support among their workforce, and to coach managers on workplace conflict resolution. The young new hires of Generation Z missed out on crucial moments of growth in the social and educational sphere, so they may lack the soft social skills such as networking, speaking confidently in public, negotiating, that give them confidence in the workplace. Supporting 'the whole person' at work in this landscape is not a 'nice-to-have' but a pathway to retaining talent and sustainable performance.

# The workforce scenario in manufacturing



Insights study 'Creating Pathways for Tomorrow's Workplace Today' surveyed more than 800 US manufacturers from organisations of all sizes and across all sectors in two separate online surveys between December 2020 and February 2021. 77% of manufacturers surveyed anticipated ongoing difficulties in attracting and retaining workers in 2021 and beyond. The survey revealed two important aspects that define the immediate shortages the industry faces: the challenge of entry level positions and the difficulty finding skilled talent. The entry level roles are those that do not require technical know-how or industry knowledge, but instead require common sense and an ability to listen, learn and follow through. Sources for these roles could be school leavers or people moving from other industries such as hospitality or the food services sector, but the survey indicated that this movement was not happening despite starting wages in US manufacturing being higher than local minimum wage levels.

The second area where manufacturers are having difficulty filling jobs is among middle skilled roles. These roles demand more experience and specialised skills, and may involve further training, licencing and certifications. The third and most significant challenge for the manufacturing sector is the continuous rapid development of the digital transformation across the industry. The skills needed to do many of the jobs in a smart factory will need a far greater knowledge of programming, Augmented Reality (AR) and Virtual Reality (VR), Artificial Intelligence (AI), high level data management and so on than many current workers possess. Attracting and retaining the right candidates for these new roles is a crucial challenge for the industry because without making changes to the skills composition of the workforce US manufacturers could leave up to 2.1 million jobs unfilled between 2020 and 2030, impacting everything from productivity to innovation and competitiveness to GDP.

#### **Reasons for unfilled roles**

Like the wider employment picture during and post Covid, manufacturing was affected by workers reassessing their work life balance, as they may have been temporarily or permanently laid off or faced difficult personal choices around work and family commitments



Source: Deloitte analysis of data from multiyear Deloitte and The manufacturing Institure skills research studies

during lockdowns. Some who were able to retire early made that choice or began planning for it sooner than expected. Others saw opportunities for a different type of work in warehousing, distribution and home delivery as online shopping exploded, areas where there are more opportunities for flexible schedules and better work life balance. In fact, for both entry level and higher positions it seems that candidates now have different expectations for jobs and careers. In line with other studies, the 2020 Deloitte Global Human Capital Trends study defined well-being as a top trend cited by 80% of respondents across industries. However, it is also the top area where respondents believe manufacturers fall short, and work life balance is the top reason that respondents are considering leaving the manufacturing industry.

Of course, people need to work, and where there are jobs available in manufacturing they will take them if there is no other choice. But unless manufacturers find ways to make the workplace more fulfilling and accommodating to employees' needs, they will likely move on at the first opportunity for something that suits them better. In the PwC Global Workforce Hopes and Fears Survey, 45% of respondents in roles which do not permit them to work remotely reported less satisfaction in their job than those working in hybrid or fully remote work settings. They were also 'far less likely than others to say they find their job fulfilling, believe that their team cares about their well-being, think that they're fairly rewarded financially, or feel they can be creative in their work.'

# Managing the workplace gaps in manufacturing

# Diversity, Equity and Inclusion (DEI)

An August 2022 McKinsey article 'What is Diversity,



Equity and Inclusion' provides a simple definition of DEI: 'three closely linked values held by many organizations that are working to be supportive

### of different groups of individuals, including people of different races, ethnicities, religions, abilities, genders, and sexual orientations.'

It is clear that the emphasis on different groups as the focus of these measures will vary greatly depending on the degree of homogeneity or heterogeneity of the society and organisation in question, local laws and customs and so on. But it would be fair to say that considering the role of women in the workforce, and that of people of different ages and experience, must be important factors everywhere in the world in attracting and retaining employees.

For women, flexible schedules enabling a better balance between work and family life may make working in manufacturing more attractive. Providing spaces and forums at work where women feel safe and can express ideas and concerns can be important in many environments. Offering further training or different work schedules including part-time working may make it more attractive for older workers to stay in the workforce, retaining their experience and skills for longer. Ensuring that new young hires are well supported and provided with interesting opportunities for training and growth will encourage them to stay and contribute. In all cases, providing real opportunities to listen to what employees want, finding ways to act on their needs, and ensuring that they feel genuinely safe and supported, will build the kind of work environment that attracts and retains workers.

As in all cultural change and embedment, the workforce will buyin if they see policies in action, and have the chance to voice concerns and suggestions. Coherent communication and visibly authentic day-to-day behaviour from leaders is essential in embedding genuine DEI throughout an organisation. Linking leadership performance to DEI metrics is a good way of ensuring this. As one executive in the Deloitte study noted, "I don't care if we are really good at recruiting more than our fair share of diverse talent. At the end of the day, people leave because of culture and the environment they're working in."

#### Talent attraction and retention

The impact of not filling job openings and not having the right skill set in the workforce to respond to market demands can be felt in a number of ways for manufacturers. Almost eight in 10 manufacturing executives surveyed by Deloitte indicated that not filling jobs had an impact on maintaining production levels to satisfy growing customer demand, responding to new market opportunities, supporting new production development and innovation, and even implementing new technologies.

In a market with a shortage of candidates, moving away to some extent from traditional job descriptions and recruiting methods may open up new possibilities for employer and employee. Re-evaluating the talent management approach by designing roles that include ongoing invention and evolving skills, with aligned training for this continuous learning model will attract a different type of talent into the organisation.

Forging connections with local communities close to manufacturing plants, getting involved with local schools and higher educational institutes, partnering in training and development schemes so that students and educators are aware of the possibilities for future careers, can boost attraction and interest around the industry.

Al in recruitment is a growing trend and can certainly speed up candidate selection processes in searching for key characteristics needed for specific roles and experience. It can also offer a way to avoid hidden bias that may occur during 'human-only' selection and interview. However, removing the human touch completely is risky, as the candidate may feel that the process lacks the human touch, and both company and candidate lose an early opportunity to evaluate the company culture fit.

Internally, evaluating the skills and capabilities of the current workforce and encouraging internal talent movement to the areas with most need will bring more agility and adaptability. This more horizontal model can be supported by bonuses, raises, promotion, professional training, greater work flexibility. Taking a new look at both internal and external candidates who may have taken a non-traditional pathway to arrive at their current situation, and whose experience may fit the bill for the required role can bring surprising areas of growth for the company and the individual.

Supporting employees by providing specific upskilling opportunities to meet evolving organizational needs will be important to grow into the requirements of increasing digitisation. There are a number of advanced technologies that can be used in training environments to increase digital fluency, for example, AR/VR glasses can be used to simulate new tasks and help employees develop the skills needed to accomplish the tasks.

#### Conclusion

While a focus on digital skills for the future of manufacturing will be essential, these skills alone will not be able to solve the broader global workforce gaps. In the 2021 Deloitte Global Resilience study, flexibility/adaptability was ranked by manufacturing respondents as the most critical workforce trait for an organisation's future. Therefore, when recruiting and supporting the workforce of the future, it will be important for manufacturers to look for and cultivate innate human capabilities at the same time as ensuring that people have the digital skills to satisfy the emerging new roles in manufacturing production.

# MANAGING SUPPLY CHAIN CHALLENGES IN A DIGITALLY TRANSFORMED WORLD

Supply chain, two words that until recently were only really familiar to those working in the sectors where they play a crucial role. When something works smoothly the vast majority of people do not even realise it is a factor in their everyday lives: they can buy any product they like when they like, supermarket shelves are full, staples and luxuries are freely available, there is plenty of choice. But...



Recent events have overturned this situation, bringing the words 'supply chain' to the forefront of the public's awareness. Covid-19, the war in Ukraine, climate change, Brexit in the UK, have all impacted people's everyday lives. Shelves empty of toilet paper during the early stages of Covid 19, delays in production and delivery of household appliances and new cars, supermarket shelves lacking certain fruit and vegetables in the UK, are all due to supply chain issues caused by upheaval, natural or man-made or a combination of the two.

#### What is a supply chain?

In simple terms, supply chains focus on the efficient delivery of a product or part to a customer. Supply chains have evolved over time and grown in complexity. However, the principle of organising material and information flow is dominant.

For example, the supply chain of a refrigerator manufacturer will include sourcing the raw material, transporting the material to the factory, transforming the material into the product, packing it, warehousing it and transporting it to the point of sale or direct to the consumer. Each of these steps has its own complexity, and may involve multiple suppliers. For example, metals, plastics and electronic components are all used in making fridges, various materials and machinery will be needed in the factory for distribution packaging, and transportation may involve several steps by road, rail or sea. Additional factors in the supply chain include information exchange and communication about the product, ordering and payment systems, and the human resources involved in the supply chain from beginning to end.

#### Supply chain in 2023 and ahead

Among the many varied challenges facing today's manufacturing supply chains not all are new or unexpected, but the rapid succession of significant disruptions within a short period of time has led to significant backlogs and bottlenecks, resulting in an increase in suppliers' delivery times of nearly twofold in 2020 and 2021. There are factors within these big challenges for now and the future which companies can control to some extent, while others are less manageable.

Average suppliers' delivery times in the US and EU in recent years



#### 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021

Suppliers' delivery times in the US and EU have slowed considerably - a lower index reflects longer delivery times.

(Manufacturing PMI, suppliers' delivery times) Note: PMI-Purchasing Managers' Index. Reading above 50 indicates faster delivery times, reading at50 signal no change and reading below 50 indicates slower.

#### Sources: IHS Markit

### Managing these challenges

## Analysing and strategising company supply chain

Even before all the unprecedented recent disruptive global events, mapping out a supply chain was one of the critical steps in performing an analysis in a strategic planning process. This analysis gives the company oversight in understanding all the other players involved in each stage of its supply chain, allowing it to plan the best ways to manage its business flow in an agile and flexible manner. In the present uncertain times, some of the major supply chain factors that companies have to plan for and respond to in order to remain competitive. even if they cannot control them, are unexpected events such as Covid 19. fuel cost fluctuations, port holdups

and other distribution bottlenecks, reduced transport availability. Longer term factors are climate change, with its myriad effects in terms of, for example, extreme weather events and related human behaviour and choices, "

Spanning multiple companies, geographic locations, time zones, and political systems, modern supply chains are intricate systems themselves

World manufacturing report 2022

availability of critical materials, and staff and skills shortages. To stay ahead of the game and be as responsive as possible, companies are focusing on the areas they can control, such as digitisation, changes to the amount of stock they hold, managing supplier relationships in different ways, and attracting and retaining skills.

#### Investing in digitisation

Building on a trend that was already underway before Covid 19, but which the pandemic has accelerated, large manufacturers are investing in digital transformation to enable early insights by better forecasts, predictive analytics and risk detection, more flexibility with data sharing, and added value by creating transparency in the supply chain. A forward-looking overview enables more speed, flexibility, precision, sustainability, and can reveal possible new business models. Enhancing the accuracy of demand fluctuations through digitisation provides insights that can be fed into a company's Sales & Operations areas. Of course, moving to greater digitisation brings the need for mindset change and for confronting issues around existing data collection systems, costs, disparities in supplier partners' investments in their own digitisation. and how to manage the increasingly large amounts data generated by the new systems.

One mindset change boosted by Covid 19 was an increased willingness to collaboratively share data between companies to manage time-saving and keep stock moving as much as possible. During the pandemic, the disruption meant that far more discussions than usual between suppliers and customers were constantly needed to coordinate and avoid bottlenecks. However, even in the most digitally advanced industries, most of this 'emergency' communication is analogue, taking place by telephone or email, with all the inherent risks such as incorrect or incomplete record keeping. More and more companies are therefore seeing the need to aim for an end-to-end digitisation of the supply chain, involving not just their own internal systems, but also that of their suppliers.

One of the challenges most companies face even internally is the issue of using several IT systems in parallel that are not or only partly connected and interoperable. This makes it difficult to combine data and to trace relationships and dependencies between data. Knowing that it will be difficult to keep all IT solutions on one single IT system. large manufacturing companies plan to develop or employ dedicated platforms with a common software architecture to integrate different data from production and logistics throughout the company and for different brands. In dealing with these supply chain data exchange needs, cloud platforms are playing an increasingly important role, by enabling a cross-company collection of data and a sharing mechanism for supply chain partners. This is helpful where it is not feasible to integrate the partners' systems into the company's, so the cloud platform is used as an addon to the internal systems, and can be shared by the different entities. In cases where near real-time data is shared. those platforms have the potential to allow a quick reaction of supply bottlenecks or demand fluctuations. A further challenge involved in the move to greater digitisation is the everincreasing amount of data generated. Companies need to find ways to

minimise this, streamlining its collection and handling to avoid high storage costs and reduce the amount of time staff spend managing it.

Companies not only recognise the need for digitisation for their own cost and efficiency purposes, but they are also being impelled by changes in regulations. For instance, several manufacturing companies envisage sharing operational data on transportation and goods receipt and sustainability datasets to enable compliance towards the required transparency demanded by the European Supply Chain Act or the European Due Diligence Directive.

#### Cybercrime and digitisation

Unfortunately, along with its undoubted advantages, increased digitisation also brings an increased risk of cybercrime, with sophisticated criminals finding ways to infiltrate supply chains and damage businesses. So an awareness of these threats, and the installation of


trusted supply chain security systems to protect data, such as blockchain or other suitable programmes, is vital.

#### Materials shortages

Global events over the last few years have influenced a move towards 'friend shoring' and 'nearshoring' where industry leaders are exploring trade links with neighbours as a means of overcoming gaps in the flow of materials from further away. When considering such changes to established supplier networks, careful analysis of the implications is needed. What will it mean for a company if they cannot source a key material or component? They may have to reformulate the product and this may impact on regulatory or customer approval. And what are the cost impacts from sourcing from new markets or suppliers: these could be positive or negative.

#### Just-in-Case vs Just-in-time

A consequence of the recent global disruption has been that many

companies are having to employ the Just-in-Time (JIT) inventory system rather than Just-in-Case (JIC). JIT aligns raw-material orders from suppliers directly with production schedules, increasing efficiency and reducing waste for manufacturers who receive goods only as they need them for the production process, thus keeping down inventory costs. This system requires great accuracy in forecasting. Clearly, recent global events have impacted on the ability of supply chain actors to make accurate forecasts, so they have had to rapidly move to a new mindset. In fact, capital tied up due to inventory plays a fairly minor role, while the availability of critical material is of greater importance. A downside of the change to JIC is that as the bullwhip effect ripples up through the system, forecasting becomes more and more inaccurate, creating excesses of stock throughout the pipeline, hitting the manufacturer the hardest. Very likely the manufacturer will be holding much greater amounts of inventory than before Covid 19, and may be paying

high rents on external warehouses. As internal and external warehouses fill up, operative flow processes are affected, waste is created, and the effect of missing parts and goods has an immediate effect on the production of finished goods.

Manufacturers can take various steps to mitigate these problems:

- Tailored inventory holding for specific material, parts, and components
- Retain as many JIT processes as possible
- Increased timelines for approval of material purchases at the supplier
- Shortening of timelines for production approvals to ensure correct versioning of parts and components

• Enhanced supplier development with focus on parts availability: multiple suppliers with focus on the availability of parts rather than as previously on quality and process improvement

#### New approaches to partnerships

#### Sustainability

An important factor today when building new supplier partnerships or developing and adapting existing ones is sustainability. Regulatory bodies and customers are bringing increasing pressure on manufacturers to implement ecological criteria such as CO2-neutral production and to adhere to social standards. Certainly buying costs remain the central criterion for companies when selecting suppliers, but the impact of Environmental, Social and Governance (ESG) scrutiny is also influencing their selection processes.

In aligning their internal goals with regulatory sustainability requirements, companies are also meeting an important and growing consumer demand for effective and verifiable ecological credentials. And so, many companies are increasingly imposing regulations on their suppliers to comply with their internal goals. Incorporating supply chain sustainability considerations early in the product development process, e.g. product design for supply chain adaptations or even recycling processes, becomes increasingly important.

The need to set up processes for recycling and the need for reduction in transport emissions to enable a product CO2 neutrality will accelerate a transition to regional, circular supply chains, ideally leading to zero waste.

Returning once more briefly to the topic of digitisation, we can see how it touches all areas of the manufacturing industry. With sustainability, it enables the setting up of more climate-friendly production processes. The technology is now available to digitally trace material flows throughout the entire supply chain to provide transparency and security, and enable consumers to have a verifiable and trustworthy overview of the whole supply chain process, so they can make informed purchase choices in line with their values.

#### Supply chains of the future

In the past, supply chains were typically configured for running on a long-term

basis, prepared for known risk events. The disruptive events of recent years, however, pushed companies to rethink their approach to resilient strategies. Companies realised that not all risk events can be prepared for. Especially unexpected risk events like Covid 19, but also exceptional high impact events like the blockage of the Suez Canal, require different methods and approaches for the management of supply chains. This has brought about a shift of paradigm from resilience to adaptiveness. The implementation of adaptive supply chains means that advanced and future supply chains will be more dynamic with temporary settings, sometimes created on-demand in order to better cope with supply risks, market demands and volatility in volumes. In some cases, this will reflect in a more complex and wider network of supply chains as frequent changes broaden the number of suppliers and customers. Digitisation will be the foundation of these future adaptations, underpinned by agile and forward-thinking leadership and an upskilled workforce.

## THE YOUNG, THE PRIME AND THE WISE

# Generational perspectives on Research & Development

The richness of a company's culture is also found in the diversity of perspectives individual members of the various function teams can bring to the table. The more diverse, the richer the discussion, and the more successful the organisation. In other words, diversity is good for your bottom line. And what better source of diverse perspectives than the age divide?

Here three generations are confronted with general questions about R&D, and their answers are enlightening. Though all matching Homa's culture and values, a tell-tale sign of good internal communications, they offer some surprisingly interesting and inspiring differences.

Zhicheng Yang 杨志成, from Zhongshan City in the Guangdong Province, is the wise, being the most senior of the three interviewees. Zhengyu Li 李征宇 from Guigang City in the Guangxi Zhuang Autonomous Region, is an established, authoritative member of the R&D function, and is next in terms of seniority. Our enthusiastic, blue-eyed young newcomer is Dunliang Yang 杨 敦亮 from Ezhou city in the Hubei province. First, let's find out what makes them tick, what motivates them to come to work every morning:

The young: combining product planning and performance design into competitively priced products The prime: I love working with my leader, Simon Wu, creating new ideas and transforming them into new projects.

**The wise**: Passion, and the love for mechanical engineering. Finding solutions.

Next, let's discover what they think about what makes Homa different from other companies in the field of R&D:

The young: Respect for all the employees, especially for the elders and the experienced

**The prime:** at Homa, the R&D function offers working on important projects. It also has a global vision, working with international agencies.

The wise: Homa is inclusive, and gives



Zhicheng Yang 杨志成

you space to think freely. The shorter decision making chain makes it easier to see projects through.

Now they tell us about what in their opinion is the most significant innovation projects they've worked on at Homa:



Dunliang Yang 杨敦亮

**The young:** the FF2-695 side by side model with ice and water: a totally new product in terms of performance and design, which also allowed me to cooperate with UP - Umberto Palermo -Design, acting as a go-between. An unforgettable experience.

The prime: cost-saving projects on older products.

**The wise:** the model FF4 – 730: single temperatures; muting temperature. We were given a total free hand on our design abilities.

### Finally, we've asked about the current and future challenges facing R&D:

The young: reconciling the need for large scale industrial production and an ever greater level of personalisation The prime: As pure ODM players, the difficulty of serving client brands' own distinct personalities while respecting the competitiveness principles of massive-scale production. The wise: the increasing costs of labour, given a labour-intensive product, combined with the need to provide highly efficient, qualitative and ever more diverse products.

The three recently visited Studio Volpi's European headquarters in Italy, on one of Homa's regular international field trips. These trips are part of the company's will to reach out and meet diverse cultures in the world, in an effort to better understand the different societal backgrounds of its clients and their final customers.

This is particularly important for R&D specialists, as they can acquire precious first hand insight into the mentalities, the aspirations and the needs of the real people whom the innovations they are working on are destined. They certainly did not miss the opportunity, during the various social occasions, to check out Italy's gastronomic tradition, and seemed to particularly appreciate pasta-based specialities.

They all had different orders, but sadly we didn't have time to check out what the preferences of the young, the prime and wise were in this case!



Zhengyu Li 李征宇

Editor in chief: Federico Rebaudo

Editorial coordination: Studio Volpi srl

**Contributing writers:** Pierre Ley, Eileen Robinson

**Design & Layout:** Studio Volpi Project coordination: Federico Gallina

Copyright © Homa 2023 All rights reserved

March 2023





homa.cn homa-europe.eu