



# GEARING UP FOR OPTIMUM PERFORMANCE

SOLUTIONS FOR COMPONENT AND MACHINE  
MANUFACTURERS TO MAXIMISE GEARBOX  
RELIABILITY AND BOOST CUSTOMER RETENTION

**SHELL LUBRICANTS**  
TOGETHER ANYTHING IS POSSIBLE

# EXECUTIVE SUMMARY

In the world of manufacturing, it is the gearbox that keeps the wheels of industry turning. And, with the global industrial gearbox market expected to generate revenue of more than \$29 billion by the end of 2024, there is a lot depending on the performance of this single component.<sup>1</sup>

Though, more so than these large global sums, the success of each individual manufacturing company is dictated by the consistency and speed of production that their gearboxes are able to deliver on a daily basis. As such, maintaining their lifespan and efficiency is vital when trying to protect and grow the bottom line of their business.

Safeguarding this performance is, in large part, dependent on the application of an effective lubrication programme. But although many equipment failures are caused by poor lubricant choices, end customers often don't appreciate the impact this can have on a business.

In turn, such failures can also have drastic consequences for equipment manufacturers, whose expertise, reputation and customer retention rates can all suffer as a result. It is therefore essential that Original Equipment Manufacturers (OEMs) are equipped with the correct knowledge to best advise their clients on effective lubricant usage. This will help meet the operational needs of their customers and encourage repeat business.

The following paper will explore four of the major challenges currently facing the manufacturing industry. Each issue will be approached in relation to the effect it has on the end customer, before outlining the insights and advice equipment manufacturers can use to help their customers progress, in turn, strengthening the business relationship.



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# THE OPERATIONAL LANDSCAPE

## On the production line to growth

Not only was the global industrial gearbox market valued at approximately \$11.49 billion in 2017, but it is due to grow at a Compound Annual Growth Rate (CAGR) of around 14.25% up until 2024.<sup>2</sup>

This forecasted growth is being largely fuelled by advancements in technology across the manufacturing sector, particularly an increase in the use of automation. However, a greater uptake in automated technology brings with it a need to ensure best practice maintenance procedures are in place and maintenance costs are reduced.

In a rapidly evolving market, end customers are increasingly reliant on the information they receive from those located before them in the production line. As such, equipment manufacturers hold an important position in this network, situated as key industry influencers.

In fact, 87% of companies state their willingness to receive information from third-party experts.<sup>3</sup> It's time for equipment manufacturers to take hold of this influential position by equipping themselves with the expertise their end customers may lack. Bridging this knowledge gap will help to optimise equipment performance and make the transition into Industry 4.0 as successful as possible.

With this opportunity in mind, we have outlined the four main obstacles faced by end customers in regards to gearbox inefficiencies. These are then explored in light of how equipment manufacturers can strengthen their business relationships, by helping their clients turn these challenges into opportunities to create a competitive edge in their marketplace.



# \$11.49bn

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up until 2024.<sup>2</sup>

# EQUIPMENT RELIABILITY

## Customers can be overwhelmed and unaware

While those working in the general manufacturing industry must know their own business inside-out, purchasing decisions – in relation to products and services – can often cause operational headaches. Whether they are suffering from a lack of reliable information, or in fact an excess of material has caused ‘analysis paralysis’ to set in, there is no escaping the fact that the buying market has become increasingly complex.

In reality, end customers are often in search of one simple thing: equipment reliability. Once their equipment can be trusted to perform consistently, many other factors will fall in to place as a result.

## There is a need for trusted industry voices

In this time of uncertainty, equipment manufacturers are perfectly positioned to assume the role of a trusted and reliable source of expertise. By recommending the correct maintenance measures, including lubricant solutions, OEMs can enable their equipment to function at the peak of its ability.

Securing greater equipment performance for their customers is guaranteed to strengthen the customer-manufacturer relationship, with a large likelihood of this translating into customer retention and repeat business.

On the other hand, it is vital not to put this trust at risk by providing insufficient or unreliable products and services. Should their equipment fail to consistently perform – as a result of ineffective lubricant practices, or other maintenance issues – customers may gradually lose faith in their manufacturer’s ability to provide the correct solutions.

## Using the right oil for the job

Choosing the correct lubricant is crucial to optimising gearbox lifespan. In today’s manufacturing environment, improper lubrication leads to 70% of equipment failures.<sup>3</sup> Though gearboxes have experienced a general decline in cost, maintenance fees are still regularly seen as disproportionate to their worth.

And with a clear gap in knowledge around effective lubrication management, there is arguably a large need for authoritative voices that can help customers navigate this challenging environment and ensure they are making the right decisions for their equipment.

Add to this the fact that 87% of companies will look to their equipment provider/manufacturer for training, and the opportunity is brought further into focus.<sup>3</sup> Especially when this training includes clear lubricant advice for equipment installation and maintenance.

## THE EQUIPMENT EQUATION

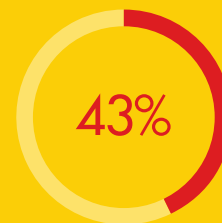
An evident knowledge gap exists within the manufacturing industry, with companies not fully comprehending the significance that an effective maintenance regime can have on the reliability of their equipment. For example:



find it hard to keep up with best practices



do not think a proactive maintenance strategy could result in fewer equipment breakdowns



do not believe choosing higher quality lubricants can help improve productivity

## HOW WE CAN HELP



Built on decades of experience and developed by technological experts, Shell's range of high-quality lubricants are specially formulated to increase component efficiency, prolong equipment life and reduce operational downtime.

- Shell Omala S4 GXV is designed to meet the latest manufacturer seal requirements and provides excellent load-carrying performance. Improved wear-protection, rust inhibition, copper corrosion protection and high oxidative and thermal stability, all help to extend maintenance-free operations for lower costs and higher productivity.
- Shell Omala S2 GX is formulated to have improved oxidation stability, wear separability, demulsibility and micropitting performance, to help your gearbox last longer, while helping to reduce Total Cost of Ownership (TCO).<sup>4</sup>
- Beyond the product...Shell LubeAdvisor is a service designed to ensure manufacturers are using the right oil, at the right time, every time – helping to lower operational costs in the process.

# APPLICATION ISSUES

## Lubricants play a pivotal role in overall equipment productivity

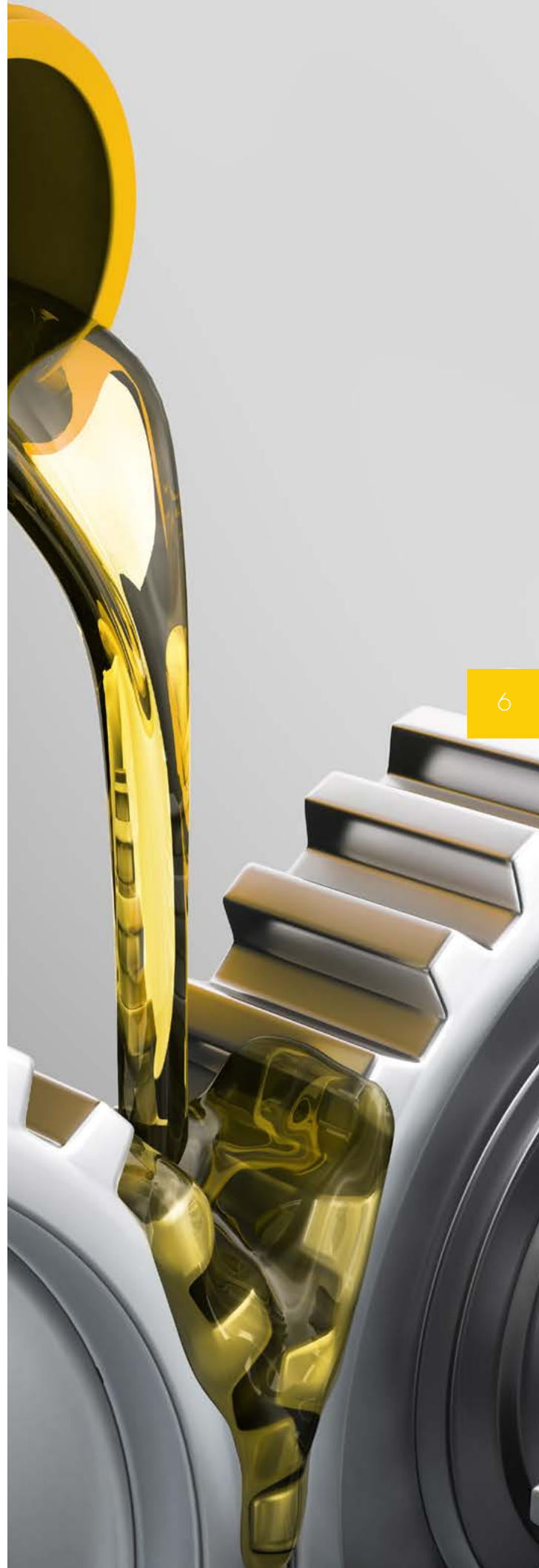
Manufacturing equipment is only as effective as the maintenance procedures put in place around it. Just as OEMs are responsible for the equipment they provide to customers, lubricants are largely responsible for the overall productivity and reliability of that equipment, particularly in relation to gearboxes.

According to one leading gearbox manufacturer, seal issues are the main limits on extending operating times before maintenance is required – and approximately 40% of seal failures relate to oil compatibility problems.<sup>5</sup> So, it's more important than ever that equipment manufacturers are able to provide guidance on how to best optimise equipment through the use of high-quality lubrication practices.



“Proper lubrication is the single most important factor in ensuring the continued performance of a gearbox. OEMs need to be aware of the connection between their machines and the lubricant being used inside of them as, if a machine is not performing on the factory floor, the customer will often look to the equipment manufacturer for answers. Through partnering with Shell Lubricants, companies can better position themselves as a trusted resource for their customers and, ultimately, provide the solutions that their customers need to reach peak performance.”

Ulf Rieper, OEM Manager, Shell Lubricants



# THE FORMULA FOR EXTENDING GEARBOX LIFE

While equipment manufacturers are designing and producing longer-life gearboxes, high-quality lubrication technologies are increasingly required to keep these components performing efficiently day in, day out. The correct gearbox lubricant should include:



## OXIDATIVE & THERMAL STABILITY

Higher operating temperatures can raise the rate of oxidative and thermal degradation of oil, creating by-products that can lead to the formation of sludge and varnish. If left untreated, these deposits can plug lines, block filters, and ultimately, cause costly downtime. Therefore, lubricants must have high oxidation resistance and excellent thermal stability to help mitigate the risks of these damaging build-ups.



## WEAR PROTECTION

Maintaining wear performance is key to preserving the condition of bearings and gears. Oils must have high load carrying capacity and wear resistance to protect moving components, in addition to good micropitting performance and scuffing resistance to ensure long bearing life.



## HIGH VISCOSITY INDEX

To help protect equipment in all temperature conditions, lubricants should be able to remain thin enough in cold environments to consistently circulate through the system and be able to pass through the filter, while becoming thick enough at higher temperatures to avoid wear.



## LOW FOAMING TENDENCY

High quality lubricants should be designed to provide rapid air release without generating excessive foaming; this will help to ensure trouble-free operation even under cycling conditions.



## ENHANCED FILTERABILITY

If the filterability capabilities of lubricants are not suitable for the machinery in question, operators can experience issues with an excessive formation of sludge, foaming and additive removal which will hamper the overall performance of the equipment.





## The financial cost of a breakdown

The possible implications of equipment failing due to improper use of lubricants are huge. A survey carried out by Shell found that 20% of gear oil customers believe unplanned equipment shutdowns, due to incorrect lubricant selection or management, have cost their business \$250,000 or more.<sup>3</sup>

But these damages do not only affect the customer. The reputation of the equipment manufacturer as a supplier and advisor may be brought into question as a result, not to mention the effects this loss of trust can have on future business. It is therefore in the manufacturer's best interest to take the necessary steps to minimise breakdowns across a machine's lifecycle, by recommending the most suitable lubricant and maintenance solutions for their customer's needs.

A large part of this conversation revolves around the notion of Total Cost of Ownership (TCO).

## TOTAL COST OF OWNERSHIP:

This ever-important consideration uses life cycle costing to help determine best product management. "Taken in the broader context of economic decision-making, product ownership costs, over the whole product lifecycle, are often significant, sometimes exceeding their acquisition costs by a multiple. Researchers also argue that up to 70-90 % of these total life cycle costs become defined already in the design phase.<sup>6</sup>

With many companies employing TCO evaluations to measure operational performance, if an equipment manufacturer can help a customer reduce these costs through integrated maintenance solutions, they can go a long way to strengthening the business relationship.

## LUBRICANT SELECTION AND MANAGEMENT ARE UNDERVALUED:

Fewer than 1 in 10 think savings could exceed 25%. However, in reality, lubricants can impact up to 30% of maintenance budget. Ineffective lubrication can lead to equipment damage and ultimately downtime, which requires costly replacements and labour.<sup>3</sup>

## HOW WE CAN HELP



Shell has more than 700 technical experts globally, whose industry experience and long-standing OEM relationships enable customers to achieve their ambitions, no matter the requirements.

- Shell LubeAdvisor helps you resolve problems and optimise the lubrication process, by providing access to our technical experts who can provide individual consulting, troubleshooting and research into specific operations.

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# 20%

of gear oil customers believe unplanned equipment shutdowns, due to incorrect lubricant selection or management, have cost their business \$250,000 or more.<sup>3</sup>

# WARRANTY CLAIMS

## Correct lubricant management is vital for reducing warranty claims

While recommending the right lubricants for equipment is important, equally key is providing end customers with training on correct handling, storage and application procedures. Almost one in three companies believe more advice from equipment manufacturers would improve their maintenance practices.<sup>3</sup>

The importance of lubricant management for equipment manufacturers is two-fold. Firstly, poor lubricant management raises the likelihood of equipment failure and therefore increases the chance of customer claims within equipment warranty periods. The end result of this is a greater outlay by the equipment manufacturer in terms of replacement parts, hours spent, and labour costs incurred.

Secondly, poor lubrication practices can adversely affect the performance of the gearbox components that have been supplied to the end customer. With operating efficiency a key KPI for businesses, this reduced productivity can dissuade customers from re-purchasing from that particular OEM.

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# 58%

of companies often experience equipment breakdowns due to ineffective lubrication<sup>7</sup>

## Reducing the frequency of in-service issues benefits all

It's not a new theory, but it still applies: the best way to reduce the impact of maintenance issues, is to prevent them from happening in the first place. A McKinsey Global Institute report, 'The Internet of Things: Mapping the Value Beyond the Hype', suggests that manufacturers' savings from predictive maintenance could potentially reach \$630 billion globally, by 2025.<sup>8</sup>

Through a holistic approach to equipment operation – including expert advice concerning specific lubricants, as well as effective predictive maintenance – equipment manufacturers can greatly reduce the frequency of on-site issues, saving themselves reputational risk, unaccounted-for hours and financial spend.

A significant, but often undervalued, part of this process involves the correct usage of lubrication charts – the part of the equipment manual that recommends which lubricants should be used in the equipment. When providing machinery, equipment manufacturers must ensure that the lubrication chart included provides customers with clear, structured and effective advice. Leaving key decisions regarding oil – for example, choosing a CLP specification – to the end customer, may result in equipment performing inefficiently.

Ultimately it is in the interest of OEMs to be suitably equipped with the products, services, and knowledge that can help position their customers for success.



# PREDICTIVE MAINTENANCE 101

With productivity of chief importance, the correct predictive maintenance routine can help increase output capacity by minimising unplanned equipment downtime. As part of this, regular oil analysis can help provide key data points that will go a long way to improving asset reliability, in addition to identifying and eliminating repetitive equipment issues.



## OIL CONDITION

The main reason for performing oil analysis is to better understand the general condition of the oil being used. Understanding the physical and chemical state of the oil will help illuminate the overall condition of the equipment from which the sample has been taken.



## CONTAMINATION

Oil analysis can test for a number of contaminants that may be negatively affecting equipment, including abrasives and water, caused by the deterioration of seals and breathers. It can also help determine whether the lubricant being used is the most appropriate for the equipment and conditions in question.



## WEAR

Excessive wear can be caused by a number of issues, from excessive loads to general component fatigue. Vibrations, noise and oil leakage may be early indicators of component wear failure, but ultimately, an effective oil analysis can help identify the root cause of the problem.

## HOW WE CAN HELP



With a wealth of experience in the lubricants sector, Shell has a suite of innovative products that can help equipment manufacturers equip themselves with the knowledge and tools required to boost customer retention and secure future business.

- Shell LubeAnalyst is an oil condition monitoring service that helps to ensure equipment and lubricants are in optimum working order, by identifying potential oil or equipment failures before they become critical.

# LEVERAGING INDUSTRY 4.0

## Industry 4.0: the future of gearbox performance

While the initial impact of Industry 4.0<sup>9</sup> is already being felt, in the coming years, these technologies will become increasingly important in helping the industry progress. From robotics to connectivity and the Industrial Internet of Things (IIoT), there are many potential capabilities for increased equipment performance and productivity.

For example, a recent report by Accenture found that the adoption of IIoT technologies for predictive asset maintenance can help increase productivity by 30%, resulting in up to 70% fewer breakdowns.<sup>10</sup>

IIoT predictive asset maintenance can reduce overall maintenance costs by up to

30%<sup>10</sup>

Beyond buzz-words and initial excitement however, there is still reluctance to invest in new equipment while current equipment is still operational. In fact, 65% feel that the costs of new technology outweigh the benefits.

Nevertheless, in such a highly competitive economy, the consequences of falling behind the competition can be disastrous. Failing to recognise the growing impact of Industry 4.0, and subsequently acting on it, will arguably lead to lower operational efficiency and missed profits.

To generate a culture shift regarding this thinking, Industry 4.0 technology must be framed as an operational investment that will help optimise performance and ultimately lower TCO. So, how can equipment manufacturers help dictate the conversation?

65%

feel that the costs of new technology outweigh the benefits.





## Bridging the knowledge gap

Although 84% of global business leaders asserted that they could create new income streams from IIoT, 73% don't have concrete plans to implement it – and only 7% have developed a comprehensive strategy.<sup>9</sup> There is evidently a clear knowledge gap to bridge when it comes to customer understanding of the protective measures required for high-value equipment and the potential benefits of Industry 4.0 technologies.

By leveraging Industry 4.0 services, equipment manufacturers can help customers better understand the mechanical and environmental conditions that lead to machine failures. Through highlighting the benefits of effective predictive maintenance – ultimately, preventing equipment failures before they arise – OEMs can position themselves as a highly valuable asset.

One key way of achieving customer buy-in, is for OEMs to position Industry 4.0 technology as an extension of existing maintenance practices. For example, lubrication charts can be augmented through the introduction of cloud-based software, with the added accuracy allowing customers to act more proactively when approaching maintenance procedures.

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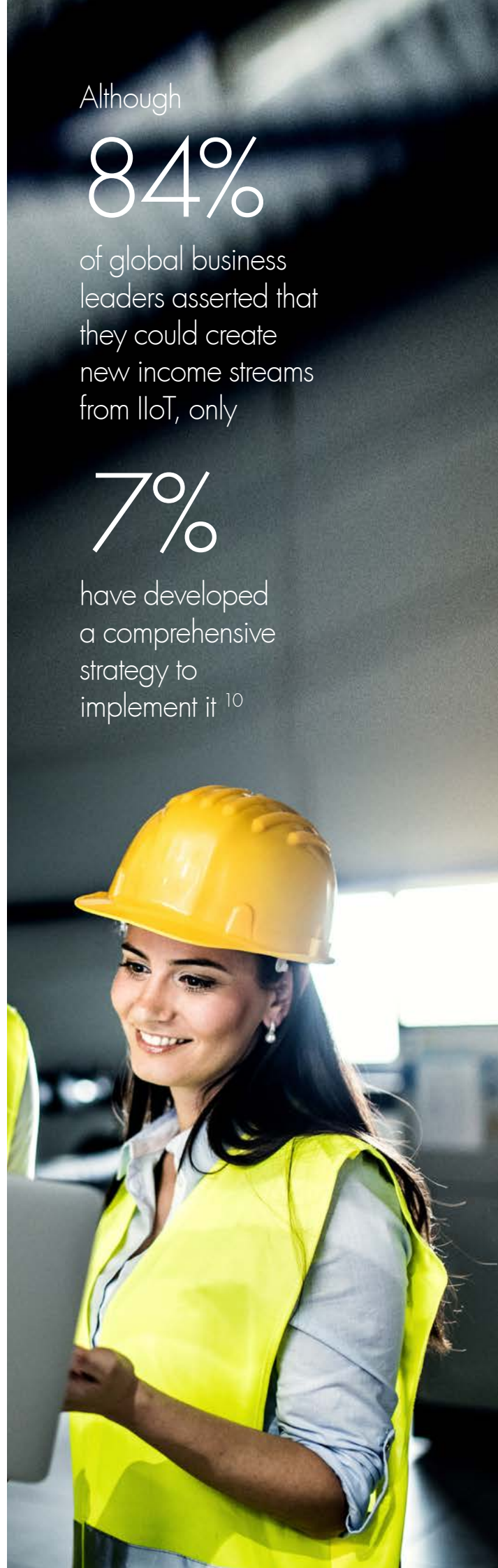
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## HOW WE CAN HELP



Shell has a range of next generation digital services that help to ease the key pain points experienced in the manufacturer-customer relationship, by delivering predictive maintenance solutions and optimising operational efficiency.

- Shell Industry Pro App is a free, globally available tool that gives access to a range of marketing information and assets, including a product selector tool, 3D and augmented reality component models, videos, brochures, value calculators and more.
- Shell LubeChat is an AI-powered virtual assistant that holds a vast array of Shell knowledge, enabling customers to make faster and better-informed decisions that can help reduce TCO.



# DELIVERING CUSTOMERS A BEST IN CLASS SERVICE

What is clear, is that a number of factors are converging to create a period of huge opportunity for the manufacturing sector. The solutions needed to maximise operational efficiency, be it access to knowledge, or new technologies, are available today. However, connecting the end customer with these solutions is the current challenge.

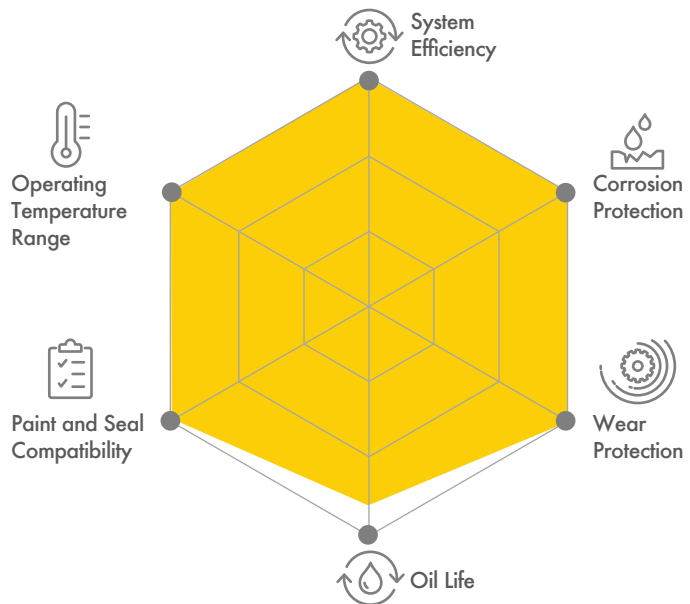
Though, as we have explored, OEMs have a unique opportunity to help customers realise their equipment's potential by joining these dots. Access to expert services and high-performance lubricants can go a long way to bridging this gap, while strengthening OEM reputation in the process.

Shell is well positioned to help in both regards. With 700+ technical experts around the globe and a suite of innovative services, we have the depth of knowledge and expertise to help OEMs succeed in strengthening their reputation and boosting customer retention rates.

Furthermore, Shell has a portfolio of high-quality lubricants to meet your equipment's specific needs, helping to simplify operations and lessen the risk of product malfunctions:

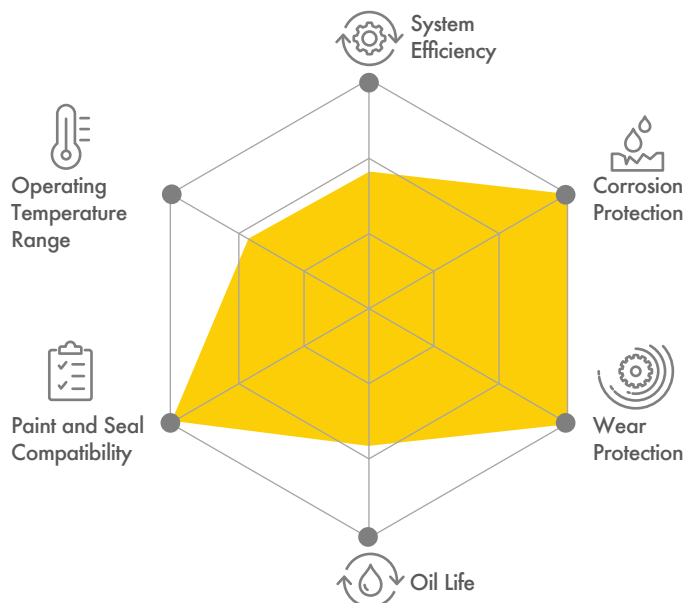
## Shell Omala S4 GXV

is designed to meet the latest manufacturer seal requirements and provides excellent load-carrying performance. Improved wear protection, rust inhibition, copper corrosion protection and high oxidative and thermal stability, all help to extend maintenance-free operations for lower costs and higher productivity.



## Shell Omala S2 GX

is formulated to have improved oxidation stability, wear separability, demulsibility and micropitting performance, to help your gearbox last longer, while reducing TCO.



# A FINAL WORD

This is a time of tremendous opportunity for gearbox manufacturers. The current customer knowledge gap surrounding effective lubricant application is one they are set to bridge, at a time when the global industrial gearbox market is growing at a rapid rate.

But these opportunities do not come without their own challenges. A lack of lubrication knowledge, and its proper application, will lead to an increase in unplanned equipment shutdowns and last-minute repairs – damaging the business relationship, risking the likelihood of re-purchasing and causing long-term financial losses for both parties.

Therefore, it is key that manufacturers equip themselves with the correct knowledge on gear oil lubricants, in order to prevent equipment failures before they happen and to position themselves to the customer as a highly valuable asset.

Shell Lubricants provides solutions to deliver a great customer experience, building trust and continued loyal partnerships between equipment manufacturers and their end customers. Our insights and resources can be invaluable in filling the knowledge gap, equipping manufacturers with the expertise their customers require and deserve.

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As the industry gears up for further growth, industry collaboration and knowledge will be critical to its sustained success.

For more information on how Shell and OEMs can work together to help drive progress in the industry, visit: <https://www.shell.com/business-customers/lubricants-for-business/shell-expertise/be-the-gear-oil-expert-your-customer-demands.html>







## FOOTNOTES

1. <https://www.globenewswire.com/news-release/2018/11/01/1641212/0/en/Global-Industrial-Gearbox-Market-Will-Reach-USD-29-20-Billion-By-2024-Zion-Market-Research.html>
2. <https://www.globenewswire.com/news-release/2018/11/01/1641212/0/en/Global-Industrial-Gearbox-Market-Will-Reach-USD-29-20-Billion-By-2024-Zion-Market-Research.html>
3. This survey, commissioned by Shell Lubricants and conducted by research firm Edelman Intelligence, is based on 353 interviews with manufacturing sector staff who purchase, influence the purchase or use lubricants / greases as part of their job across 7 countries (USA, China, India, Germany, Russia, Indonesia and the UK) from March to May 2018. For more information, please visit [www.edelmanintelligence.com](http://www.edelmanintelligence.com)
4. Total Cost of Ownership (TCO) is defined by Shell Lubricants as the total amount spent on industrial equipment, including cost of acquisition and operation over its entire working life, including costs of lost production during equipment downtime
5. [https://www.shell.com/promos/lubes/btb-products/omala-product-brch/\\_jcr\\_content.stream/1533020662055/c1e4ed716abfa0793a7e1e96f4a9384962919e8d/shell-lubricants-omala-family-brochure-lo.pdf](https://www.shell.com/promos/lubes/btb-products/omala-product-brch/_jcr_content.stream/1533020662055/c1e4ed716abfa0793a7e1e96f4a9384962919e8d/shell-lubricants-omala-family-brochure-lo.pdf)
6. Vlachy, J., 2014, Using the life cycle costing for product management
7. Shell TCO Phase 2: General Manufacturing Global Report
8. <https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/McKinsey%20Digital/Our%20Insights/The%20Internet%20of%20Things%20The%20value%20of%20digitizing%20the%20physical%20world/The-Internet-of-things-Mapping-the-value-beyond-the-hype.ashx>
9. Industry 4.0 technologies are defined as technologies that support the digitisation and automation of operations (e.g. sensors, connected equipment, the internet of things, autonomous equipment, cloud based or big data-based technologies).
10. [https://www.accenture.com/\\_acnmedia/pdf-5/accenture-804893-smart-production-pov-final.pdf](https://www.accenture.com/_acnmedia/pdf-5/accenture-804893-smart-production-pov-final.pdf)

