By Catherine Larkin

# Chilling success ... Navigating the cold chain

n today's highly competitive retail world, success is not just about having the trendiest products or the slickest marketing campaigns. It also means ensuring customers get their goods in the best possible condition, especially perishable ones. Retailers increasingly realise that to stay competitive, they must improve their cold chains. They gain a significant competitive advantage by continuously investing in the logistical and technological systems that keep temperaturesensitive products fresh - from production to the consumer's hands. Not only can they market their commitment to product quality and safety, attracting discerning consumers willing to pay a premium for peace of mind, but also, efficient cold chains reduce operational costs.

One of the most significant factors driving the need for improved cold chains has been the rise in demand for temperature-sensitive products. Consumers are increasingly seeking fresh and frozen foods, pharmaceuticals, cosmetics, and electronics that require controlled temperatures

Image courtesy of jpargeter, Freepik

during storage and transportation. Customers have become more accustomed to convenience and quality, and their expectations for products' freshness are higher than ever. They expect their groceries to be crisp, their medications potent,

and their cosmetics unspoiled. Any deviation from this standard, such as items arriving partially thawed or spoiled, can result in lost sales and severe damage to a retailer's reputation. The cold chain, however, encompasses a complex series of steps, from production to delivery. As Professor Rose Luke from the University of Johannesburg's Faculty of Transport and Supply Chain Management points out, maintaining a consistent temperature throughout the supply chain is the primary challenge. This becomes particularly tricky when multiple parties are involved, sometimes covering significant distances and crossing borders. She says ...

> The key here is making sure that everyone involved is in sync, that procedures match up well, and that responsibilities are clearly defined – especially when goods change hands between different stages.



**Professor Rose Luke** 

"It's also essential to have complete traceability and accountability throughout the chain. Achieving this level of integration in the supply chain can be quite a challenge."





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Manyanda

Shatho Manyanda, General Manager of Table Bay Cold Storage (TBCS), says specific measures are implemented at each stage of the cold chain process to ensure goods remain within the required temperature range.

Remember, the shelf life of perishable products is maintained by storing products at the correct temperature.

Image courtesy of Shamsuddin Habib, Pexels



It is crucial for this process to be unbroken to preserve the freshness, quality and safety of products – particularly perishables like dairy, meat, seafood, and fresh produce. The retail sector relies heavily on the cold chain to meet customer expectations. Nowadays, consumers demand not only freshness, but also trust in the safety of their purchases. Cold chain logistics helps maintain the quality and safety of perishable products. By keeping products at the right temperature, cold chain logistics can extend the shelf life of perishable goods. This allows retailers to reduce product waste and manage inventory more efficiently, ultimately saving costs.



Cold chain processes have found extensive use across various sectors, explains Henry Smith, Fleet Sales Director at MiX Telematics Africa. "The cold chain process is a complex and highly controlled system

Henry Smith encompassing various stages, including storage, transportation, monitoring and delivery. It relies on specialised equipment, such as refrigerated vehicles and temperature monitoring systems, to ensure that products always remain within the specified temperature range."

Bernard Henning, Manager of Cold Chain Protocols and Standards at the Perishable Products Export Control Board (PPECB), highlights the rigorous protocols to minimise temperature fluctuations and preserve the quality of goods from distribution centres to store freezers. "The PPEC Act 9 and Regulation R917 of 1983 establish comprehensive control and management of all South Africa's perishable product export processes.

Anyone involved in the cold chain value stream must adhere to this Act. Together with the Regulation, it specifies the rules that must be followed at each stage of the chain.



The cold chain is among the harshest environments in the industry, and mechanical and manual processes should be designed accordingly. To keep workers warm and happy, reduce energy and increase productivity, warehouses are investing in two kinds of automated storage – automated storage and retrieval systems.

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The South African Bureau of Standards (SABS) is pivotal in establishing national quality standards. Concurrently, the Department of Health and the National Regulator for Compulsory Specifications (NRCS) supervise food safety regulations. This includes oversight of storage temperature requirements and the enforcement of hygiene standards.

Image: www.apifirst.in Image: wwww.apifirst.in Image: www.apifirst.in Image

Ensuring compliance with cold chain management, vehicle standards, transportation permits, and meticulous record-keeping is paramount. Adopting Hazard Analysis and Critical Control Points (HACCP) principles is widespread, and individuals responsible for overseeing temperaturesensitive goods typically need training and certification. In some sectors, like pharmaceuticals and healthcare, there may be specialised regulations and quality standards specific to their products. Therefore, personnel handling and transporting such goods often undergo training and certification to ensure they have a thorough grasp of and adhere to proper handling procedures.

Continuous research and development efforts are dedicated to benchmarking the best cold chain practices, ensuring South Africa remains competitive with other countries regarding cold chain logistics. Image by courtesy of www.corporate.carrier.com



## **Enhancing retail success through cold chain logistics**

"Transporting temperature-sensitive goods poses several challenges that demand meticulous planning, advanced temperature control systems, employee training, and vigilant monitoring throughout the entire transportation process to safeguard the quality and safety of these goods," explains Smith.

"Maintaining a consistent temperature range, especially when dealing with a broad spectrum from +4 degrees to -25 degrees Celsius, is a significant challenge. Temperature fluctuations and the frequency of stops along a transportation route can jeopardise the condition of the transported goods. External heat can infiltrate whenever trailer doors are left open for extended periods, causing the internal temperature to rise. This can become especially problematic when attempting to keep goods consistently cold or frozen. It is therefore imperative to adequately maintain the temperature during transportation to ensure goods reach their

desired temperature upon arrival, potentially leading to spoilage or safety concerns. Additionally, human error plays a critical role; drivers may forget to re-set cooling units to the required temperature settings after opening the trailer doors, or during rest stops. Such oversights can lead to products freezing or thawing, resulting in significant financial losses and waste."



Image courtesy of https://adaptgroup.com

Anthony Drimen, CEO of ADAPT Cold Logistics, highlights that ensuring the integrity of the cold chain remains the paramount challenge for all stakeholders. "Over the past three years, we have observed retailers and logistics companies increasingly investing in rigid plastic Cold Cabinets,





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a significant upgrade from the previous fibreglass thermotainer," he notes. "Cold Cabinets are extensively used worldwide and offer numerous advantages, including flexibility, optimised vehicle packing, improved fuel efficiency, and enhanced eco-sustainability."

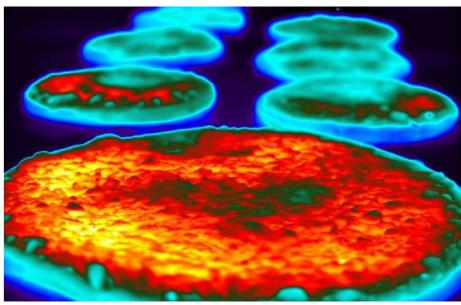
"These Cold Cabinets excel in temperature control due to the materials used in their construction and functional design, utilising LLDPE Polyethylene and Polyurethane insulation. In certain cases, these cabinets allow logistics and retail companies to temporarily or fully turn off their air-conditioning systems, running temperature-sensitive products in an 'ambient' vehicle. This approach can save 30% to 40% in fuel costs and significantly reduce CO<sub>2</sub> emissions. The ability to optimise vehicle packing by using different cabinets with varying temperature requirements within the same vehicle reduces the number of vehicles on the road, ultimately minimising fuel emissions."

Brian Mudhokwani, Chief Operating Officer (COO) of ISB Optimus, says another persistent challenge in the cold chain industry is load shedding, which significantly impacts the energy supply essential for preserving temperaturesensitive goods. He explains ...

Power outages pose a constant threat of temperature fluctuations that could jeopardise

the quality of products. Brian Mudhokwani We must rely on back-up generators and energy-efficient technologies to address this issue to ensure product integrity.

Michael Corney, Business Manager of Indirect Sales at Isuzu Motors South Africa, raises another issue related to load shedding. "It also impacts data monitoring, especially when cell phone towers are offline. Currently, there's a lack of units or loggers for real-time monitoring, and there's a pressing need for a solution in this field. Effective temperature monitoring is crucial in the cold chain."



In the food industry, it's essential to carefully control the temperature of perishable goods throughout production, transportation, storage, and sales. Food processors need tools that automate crucial operations in a way that helps minimize human error while holding down costs. Using thermal imaging cameras, you can make automated non-contact temperature measurements in many food processing applications. Image and caption by courtesy of www.flir.eu

Given that even brief temperature fluctuations can harm the quality and shelf life of perishable items, it becomes crucial for retailers to consider investing in alternative or backup power solutions, adds Smith. "These additional expenses can strain budgets and erode profitability, but power outages also complicate managing inventory, especially for temperature-sensitive goods."

"Businesses may find it necessary to reduce their stock levels to minimise the risk of spoilage during power interruptions. However, this action can result in supply shortages and adversely affect customer satisfaction. Furthermore, the road delays caused by load shedding can disrupt supply chains, leading to missed delivery deadlines and potential financial penalties."

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## The transformative power of technology

The growing reliance on technology has expedited retailers' digital transformation, directly impacting their success and long-term viability. Several innovative technologies and solutions have been embraced in response to the challenges of transporting temperature-sensitive goods while maintaining their quality and integrity. These advancements are especially vital in a country such as South Africa, with diverse climate conditions and infrastructure limitations.

Digital platforms have fostered collaborative partnerships between logistics providers, suppliers, and retailers within the cold chain. These integrated supply chain solutions are instrumental in reducing inefficiencies and enhancing overall performance, guaranteeing that goods reach their destinations in optimal condition.

The widespread use of advanced monitoring systems has been instrumental in tracking temperature conditions throughout the transportation process. Offering real-time data and prompt alerts in case of deviations from the required temperature range is an invaluable proactive approach to preventing spoilage and ensuring that goods consistently stay within the specified temperature parameters.

In regions plagued by unreliable power supply, there's a growing adoption of alternative energy sources, such as solar or battery-powered cooling units. The Internet of Things (IoT) also plays a pivotal role in transporting temperature-sensitive goods. Sensors integrated into trucks, containers,



Research and development includes efforts to advance more sustainable refrigeration solutions, develop electric cold chain technologies and introduce digital solutions that improve cold chain connectivity, visibility and effectiveness. This includes engineless, all-electric refrigeration systems for trucks, trailers and vans, and electric comfort solutions. www.corporate.carrier.com/healthycoldchain/

and storage facilities continuously monitor various parameters, including temperature and humidity. Gerhard van Zyl, Group Operations Director at Professional Risk and Asset Management, says ...



Gerhard van Zyl

Innovation is ushering in changes in various aspects, from the development of new foam materials for vehicle boxes to the introduction of temperaturecontrolled packages, including both plate and electric variants. He emphasises the high-risk nature of temperature-controlled products, necessitating continuous management oversight.

In practical terms, says Luke, it involves establishing robust processes to address every conceivable disruption scenario. Additionally, investing in top-tier refrigeration technology and rigorously adhering to operating and maintenance protocols, is paramount.

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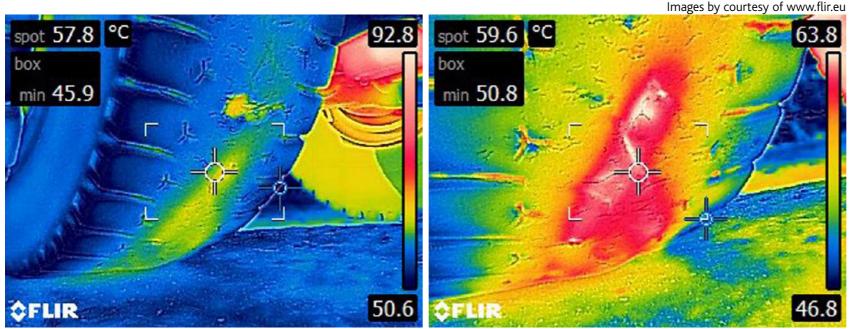
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#### Efficient inventory management ... Maximising space and resources

Manyanda points out that various inventory management techniques and strategies are employed to optimise the availability of temperaturesensitive goods, minimise waste, and ensure product quality once they reach the store. One commonly used method is the just-in-time (JIT) inventory system, which reduces the time products spend in the freezer, thus cutting down on waste. With this system, retailers order goods only when there's a demand, preventing overstocking and eliminating the risk of holding excess inventory. Continuous sales monitoring enables real-time insights and the ability to forecast future needs, aiding retailers in maintaining efficient inventory levels.

Another effective strategy is the disposition method, which closely monitors inventory levels

and manages expiration dates. Retailers prominently display products with the earliest expiry dates in the front of the freezer, while those with later expiry dates are positioned toward the back. This approach allows retailers to use the products expiring soonest, to minimise losses from expired items. Additionally, retailers employ handheld scanning devices to capture barcode information and track shrinkage in real time. This technology assists in identifying slowmoving products and inventory losses, enabling retailers to monitor and pinpoint areas needing improvement and make necessary adjustments to increase product availability.

"Data has become indispensable for making real-time decisions," says Mudhokwani. "We live in an era where technology, data analytics, and interconnected business functions offer immense opportunities to optimise and streamline operations."

## Future trends ... Advancements in technology and enhanced collaboration

Like any business, says Luke, cold chains will become increasingly data-driven. "The need for traceability will drive supply chain decisions. Tracking and tracing, where not already mandatory, will become so. Digitisation, blockchain, automation, connectivity and IoT will all play an increasing role." Manyanda agrees, saying several trends and advancements can be anticipated – particularly regarding cold chain logistics. "These developments are likely to address existing challenges and improve the overall efficiency and effectiveness of the cold chain. Advanced monitoring systems and Internet of Things (IoT) technology will become more prevalent. These systems will provide real-time data on temperature, humidity, and other environmental factors to ensure the



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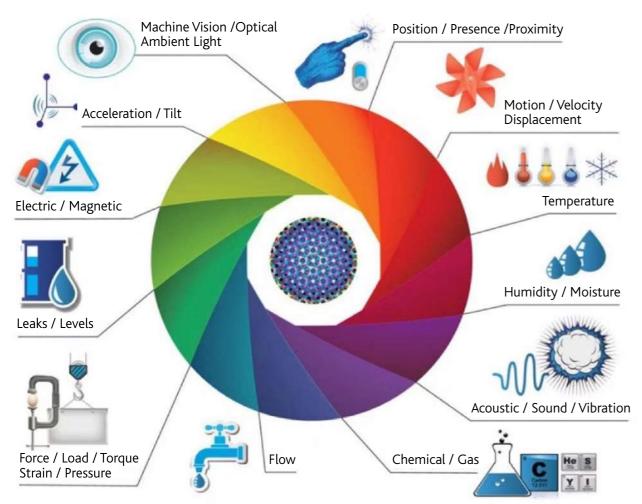
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Sensors play a variety of roles ... In addition to providing data for process control, they assist in quality assessment, asset tracking, and even worker safety. The advent of powerful, cloudbased analytical software and artificial intelligence has also allowed the use of sensor data to lower production costs through process optimisation and predictive maintenance. Once routed to the internet, sensor data can be put to a variety of uses from supply management to global coordination of production resources. Source: Postscapes: www.eetimes.eu

integrity of temperature-sensitive goods during transportation."

He says utilising IoT devices and sensors will allow for proactive alerts and predictive analytics, enabling stakeholders to address any issues that may arise promptly.

Another trend to watch out for is that of drone delivery. "Drone technology holds significant potential for specialised logistics in South Africa. Drones can enable faster and more efficient delivery of temperaturesensitive goods, especially in remote or hard-to-reach areas. Drone delivery can help overcome infrastructure limitations and reduce transportation time, thereby minimising the risk of temperature fluctuations and ensuring product quality."

According to Smith, technology in transportation is advancing steadily, encompassing innovations such as the introduction of electric vehicles (EVs) and the integration of artificial intelligence (AI). This technological evolution has played a pivotal role

in accelerating retailers' digital transformation, directly influencing their success and long-term viability. "It has fostered collaboration between retailers and their technology partners. Furthermore, AI-powered technology has proven valuable in sustainability initiatives and technological advancements, as it plays a crucial role in reducing emissions from fleet vehicles."

In the future, more attention will be given to alternative fuel vehicles, mainly as sustainability

takes on a more prominent role, considering that electric or hybrid cars can significantly reduce carbon emissions and the environmental impact of transporting temperature-sensitive goods.

"Implementing cleaner energy solutions holds the potential not only to tackle environmental challenges, but also result in cost savings, heightened energy efficiency, and adherence to regulatory requirements," says Manyanda. He also stresses a growing emphasis on blockchain technology ...

https://news.mit.edu/



We anticipate an increased role for blockchain in enhancing traceability and transparency within the cold chain. Through blockchain, stakeholders can securely document and trace the entire supply chain journey, encompassing critical data such as temperature records, quality control checkpoints, and compliance documentation.



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"This technology can effectively address issues related to traceability, product authenticity, and the establishment of trust among various supply chain collaborators." "These advancements and trends in specialised logistics for transporting temperature-sensitive goods in South Africa have the potential to improve operational efficiency, reduce costs and contribute



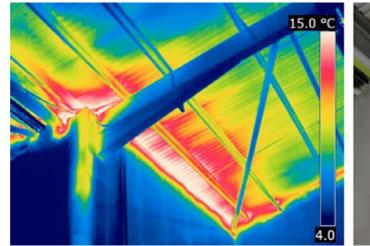
We're still talking about different degrees of commitment amidst a wide swath of segments within the packaging industry. But progress, no matter what it may be, is still progress. Image & caption courtesy of www.packagingstrategies.com

Retailers can also expect more emphasis on sustainable packaging to minimise waste and environmental impact. Manyanda continues ...

Biodegradable and recyclable materials will be increasingly utilised to reduce the carbon footprint associated with packaging. Innovations in packaging design and insulation materials can help maintain temperature integrity and extend product shelf life, while minimising environmental harm. to a more sustainable and reliable cold chain. By integrating these developments, stakeholders can address existing challenges, such as maintaining product quality, reducing environmental impact, and ensuring regulatory compliance. These new developments also have the potential to create more jobs." As the green agenda continues to gain momentum, companies will explore various options, says Smith, including looking at solarpowered refrigeration systems, particularly in light of South Africa's energy challenges.

"Autonomous vehicles equipped with built-in temperature control systems are also gaining traction in cold chain logistics, offering precise control and efficient transportation, while reducing the potential of human error."

But most importantly, say the experts, retailers can expect more collaboration. "Collaboration between logistics providers, suppliers, and retailers will be a key focus in efforts to streamline the cold chain process with integrated supply chain solutions to enhance efficiency. Remote temperature management and control systems enable real-time adjustments to cooling units,



Cold store insulation thermal imaging surveys are carried out during normal operations. Thermographics surveys of cold stores and freezers identifies insulation defects, water ingress within insulation and also warm air ingress into stores which can create severe problems. Thermal imaging also identifies problems within the fabric of the walls and roof. Image & caption by courtesy of www.pixelthermographics.co.uk/



reducing the need for manual intervention and ensuring optimal conditions during transportation. Predictive analytics, driven by historical data and environmental

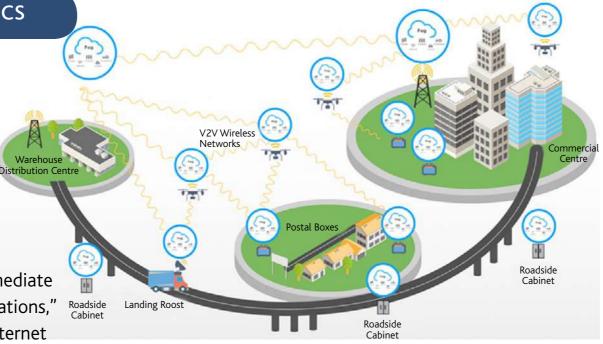
factors, allow logistics companies to anticipate challenges and take proactive measures to prevent temperature compromises. Anticipate a surge in advanced, real-time temperature monitoring solutions with enhanced data accuracy and supply





For local deliveries, individual fog-enabled drones can depart from warehouses or trucks equipped with landing platforms. There is a constant handoff of information along the supply chain route between drones and the ground support infrastructure. Image & caption: www.roboticstomorrow.com

chain visibility, facilitating immediate responses to temperature deviations," Roadside adds Smith. "Integrating the Internet of Things (IoT) sensors into trucks, containers, and storage facilities will also play a pivotal role, providing continuous data on temperature, humidity, and relevant parameters for optimising transportation routes and conditions.



The cooling industry increasingly embraces electric cooling units powered by the truck's power take-off driven electricity generation, reducing reliance on diesel fuel. Furthermore, major transporters have already adopted solar cooling



systems for trucks, with Shoprite leading the way in sustainability efforts since 2017, as reported by news outlets."

The retail giant continues to expand its solarassisted trailer fleet, now operating 903 trucks and 1 360 trailers. Among these, 1 041 trailers have solar panels on their roofs to support refrigeration needs. Additionally, these solar panels are utilised to provide power for tail lifts in the non-refrigerated section of the fleet, according to Cleantechnica.

"Temperature-controlled supply chains are part of a constantly evolving landscape," says Luke. "It is an environment where staying ahead of the curve is critical for success."



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# Securing success ... Strategies for achieving excellence

The experts agree that effectively navigating the complexities of South Africa's climate when transporting temperature-sensitive goods demands a comprehensive approach that encompasses infrastructure investment, regulatory compliance, meticulous planning, and ongoing monitoring. Investing in temperature-controlled infrastructure, including refrigerated trucks, cold storage facilities, and real-time temperature-monitoring technology, is crucial to safeguard the integrity of products – especially in regions with extreme temperature variations.

Thoughtful route planning is vital, considering factors such as altitude, climate zones, and seasonal fluctuations, while staying updated with real-time weather information ensures safe transportation. Implementing real-time temperature monitoring



www.logupdateafrica.com/logistics/

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systems allows for immediate responses to deviations, and data analytics provide valuable insights into temperature trends and opportunities for supply chain enhancements.

> Continual training for employees, well-defined emergency protocols, and appropriate insurance coverage further reduce risks associated with temperature-sensitive goods transportation. Collaborative partnerships with suppliers and producers, aimed at aligning temperature requirements and packaging recommendations, streamline the transportation process and

minimise temperaturerelated challenges. "Also develop contingency plans to address unforeseen events or emergencies, such as power outages, extreme weather conditions, or transportation disruptions," concludes Manyanda.

"Identify alternative transportation routes and storage facilities that can maintain the desired

temperature range in case of any disruptions in the original plan. Collaborate and work with experienced temperature-controlled logistics providers with extensive knowledge and expertise in managing the complexities of storing and transporting temperature-sensitive goods. These providers should have a well-established cold chain infrastructure, including temperaturecontrolled storage facilities, transportation fleets, and a robust network." **SR** 



**Catherine Larkin** is a communication and marketing professional, specialising in Logistics, Transport and Supply Chain. Her company, CVLC Communication, is a corporate public relations, communication, marketing and events consultancy. Its services range from full secretariat support, project management and administration,





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#### Ways to save

With energy cost rising and food retailers looking to improve the shopping experience environment for customers, Insulated Structures has developed an effective solution to reduce the cost of in-store refrigeration while enhancing the customer experience.

Insulated Structures doors are easy to retrofit on in-store cabinets to reduce the energy required to keep chilled foods at the correct temperature.

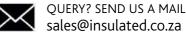
Meanwhile, customers are able to clearly see and access the products on offer. Reduced energy requirements means smaller refrigeration plant selection for new stores. These savings will off-set the initial cost of the doors. Up to 40% reduction in refrigeration requirement has been achieved.



Standard Airshield Glass Doors with a Black Frame. Heated Hybrid also available in this design. Heated Hybrid Glass Doors are fitted with a heater to reduce condensation on the doors in Coastal areas. Heated Hybrid is fitted with soft closers.

Premium Airshield Glass Doors. Frameless Door with Argon Gas filled for better insulation.





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# Optimise supply chains and drive bottom line improvement Getting the skills development basics right

The supply chain is the one function in an organisation that touches all others and supply chain optimisation can drive bottom line improvement. William Schneider, a supply chain specialist and member of the SAPICS supply chain community, says ...

Companies lose millions of rands in their supply chains every year, but there is ample evidence to show that with properly trained and educated staff, these losses can be substantially reduced.

SAPICS (The Professional Body for Supply Chain Management) supports and drives the elevation, empowerment and education of supply chain professionals across Africa, to address the skills deficit in the field, to build organisations' supply chain capabilities and to grow economies. There is growing recognition that effective supply chains are the heartbeat of any economy.

SAPICS offers education, training, and internationally recognised certifications via its network of Authorised Education Partners (AEPs), as well as comprehensive resources and an expansive



member community of individuals and businesses that share a commitment to advancing supply chain management. Among SAPICS's education offerings are short courses that have gained recognition over the years and are increasingly sought after, particularly since the Covid-19 crisis and other disruptions highlighted the importance of supply chains to everyone. From being a field that was not well understood and sometimes undervalued, working in the supply chain profession is now something to aspire to.

SAPICS short courses are designed to help individuals and organisations to get the supply chain basics right, and also offer new entrants to the field an understanding of the diverse career opportunities and varied paths available in the supply chain sphere. These courses have been assisting companies and their employees since 1982, when the

SAPICS "Basic Stores & Stock Control" (BSSC) and "Principles Of Production & Inventory Management" (PPIM) short courses were first introduced.





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# Aimed at warehouse employees, supervisors and managers

The SAPICS BSSC course is aimed at warehouse employees, supervisors and managers. It promotes stores efficiency and sound management practices. SAPICS's PPIM course provides learners with a sound understanding and base knowledge from which to advance their studies in the field of operations management. The "Basics Of Manufacturing & Operations Management" (BMOM) is a SAPICS course that offers a basic insight into production and inventory management systems and helps develop learners' interdepartmental understanding and communication.

Schneider asserts that the value of the SAPICS short courses lies in the fact that they are structured in such a way that "they prepare the learner for the challenges of the 21st century and the VUCA (volatile, uncertain, complex and ambiguous) supply chains that we are dealing with now."

In addition, the courses are designed to prepare students to advance their studies by obtaining a college or University qualification, or an international certification, he explains.

"One of the hallmarks of the SAPICS short course material is that it is constantly updated to deal with the rapid changes in the dynamic, everevolving supply chain field, despite the fact that the core concepts have not changed. The courses are written and presented to give the learner an insight into not only what they are doing, but perhaps more importantly, why they are doing it,"





Mobile robots and shelving systems.

is aimed at the supervisory and management level. It is also a forerunner to obtaining the APICS supply chain qualifications.

"The BMOM is designed to give

says Schneider, who has four decades of experience in developing the skills of supply chain personnel, both through education and training and consulting in the supply chain, industrial engineering and operations and logistics management fields.

#### Flagship SA supply chain course

The SAPICS BSSC is the flagship supply chain course in South Africa. Just about every business has a warehouse facility somewhere with stock that needs to be properly managed. This programme is aimed at the team members working in the warehouse.

"Second in importance to the field is the PPIM," Schneider contends. "This course's primary purpose is to provide a fairly in-depth understanding of the total supply chain from the nth-tier supplier through to the nth-tier customer. This programme those in the supply chain who are not directly involved in the warehousing discipline an insight into the profession in South Africa," Schneider expands. "This progamme introduces the learner to the field of supply chain management and prepares them for the PPIM."

He says that a SAPICS short course can help a supply chain practitioner to advance in their career. "Over the years we have seen our students practice the skills and knowledge that they have learned on the programmes and they found their way up the ladder, from being an entry-level store man or operator to becoming a warehouse manager or a production manager.

"Companies that have supported the programmes and can attest to this include Mercedes Benz South Africa, Toyota, Plessey SA, Aspen Pharmacare, Transnet Rail Division, Transnet Harbours and Eskom to mention only a few," Schneider concludes. **SR** Visit SAPICS: www.sapics.org.za/certifications-courses

