

JENDAMARK AUTOMATION

Jendamark Automation, based in Gqeberha, was the brainchild of Eastern Cape-born Quinton Uren who started working out of a garage in 1989. More than 30 years on, with Uren at the helm together with three other directors, Jendamark has grown from three employees to well over 700 worldwide. This homegrown company from the Eastern Cape now has a production facility in India and sales offices in Germany and the United States, and has become a global player delivering turnkey production line solutions to some of the world leading automobile manufacturing companies.

Jendamark designs and produces assembly lines and special purpose machines for companies such as Mercedes Benz, VW, Audi, ZF, Faurecia, Tata, Ashok Leyland and Mahindra, in three key areas: powertrains, catalytic converters, and electric vehicle (EV) component assembly. Anticipating the move to electric vehicles, the company has developed EV component assembly systems for that market. While the company has become a world leader in automation and assembly systems, it has begun to transition from technology which focused on automation to using new technologies providing digital solutions for production processes. The company sees itself as being an innovator and to always be ahead of the curve. Early on it saw the technological shift to digitalisation of the production environment and began, in advance of many other companies, to start building up competencies and putting systems in place to not get caught off-side by this massive shift to digital production systems. These digital manufacturing technologies have been incorporated into its assembly line solutions as well as through Odin Manufacturing and Odin Education. Odin Manufacturing provides a range of factory functions from maintenance to quality assurance and real-time reporting on production data.

TECHNOLOGICAL CHANGE AND INNOVATION SYSTEM OBSERVATORY

The aim of the Technological Change and Innovation System Observatory project is to support the Department of Trade, Industry and Competition (the dtic) and industry sectors to develop an integrated, strategic response to discontinuous technological change and disruptive innovation. It aims to equip public and private organisations to become more sensitive to global technological shifts, and the changing demands placed on the innovation system, the manufacturing sector and its stakeholders.

TRADE & INDUSTRIAL POLICY STRATEGIES

TIPS supports policy development through research and dialogue. Its areas of focus are trade and inclusive industrial policy, and sustainable development.

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August 2023

SHOWCASING TECHNOLOGICAL CHANGE

Companies adopt new technologies and digitise for different reasons. These may be innovation and staying ahead of competitors, cost reductions, reducing production times, enhancing customer support, or even as a means to resuscitate a company at risk. This series of case studies explores the success that companies have experienced in adopting new technologies and digitising their operations. Companies have made these changes over time and in all the case studies have had positive outcomes. The companies have grown, improved employment, and increased skills levels. These case studies form part of work TIPS has undertaken with the Department of Trade, Industry and Competition (the dtic) and in partnership with the World Economic Forum to showcase the benefits and importance of technological change by South African companies. This case study profiles Jendamark Automation, an Eastern Cape that has become a world leader in automation and assembly systems. Textile Mills and ModeTech Services. Copies are available at Technological Change and Innovation System Observatory.

The company is focused on using technology to unlock human potential. The directors are committed to promoting the notion that if new technologies are used and applied correctly they will not make jobs obsolete and could empower semi-skilled workers to perform more complex tasks.



The company has faced many challenges over the years, such as breaking into the international market and having to counter negative perceptions of an African-based company that has solutions for First World companies. Through this all, while receiving support from government incentives (and the Automotive Master Plan) from both the Department of Trade, Industry and Competition and the Industrial Development Corporation, the directors kept their sights on ensuring that to succeed they had to prove that they were better than their international competitors.

On entering the factory in Gqeberha, one gets a clear sense of Jendamark's reach across the globe: 95% of its products are exported to countries across Europe, Asia including China, and North and South America – and the flags of all the countries that Jendamark supplies hang from the ceiling. Another indication of Jendamark's reach is that last year it won the large-sized exporter to the US under the African Growth and Opportunity Act (AGOA).

Jendamark's digital services director Yanesh Naidoo (one of the four directors that help steer the company) stresses that "there is always a reason to improve and get better at what we do". The company began its transition some time ago into a tech company offering increasingly tech-driven solutions for its customers. As part of this transition, the company is focused on using technology to unlock human potential. Uren, Naidoo and the rest of the directors are committed to promoting the notion that if new technologies are used and applied correctly they will not make jobs obsolete and could empower semi-skilled workers to perform more complex tasks.

TECHNOLOGICAL ADVANCES

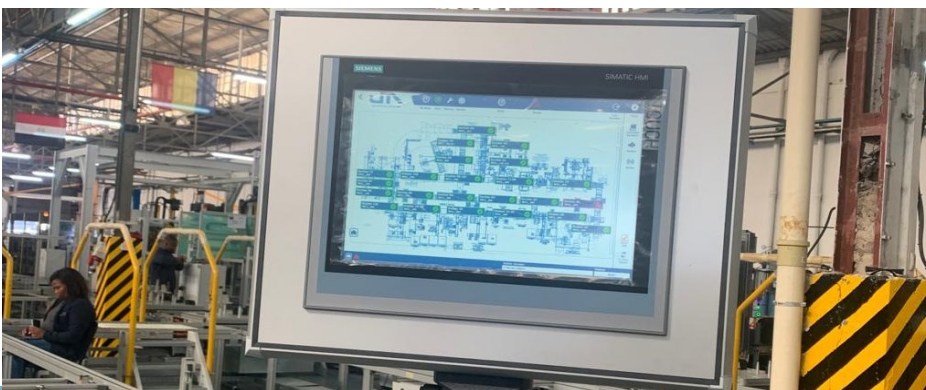
Jendamark's move to being increasingly tech driven is reflected in the development of its digital operating systems (digitally enhanced component assembly lines), which resulted in the company being named Technology Company of the Year at the Africa Tech Week awards in September 2022. Before exploring some of Jendamark's latest product offerings, it is the internal changes that have taken place which have contributed to the company becoming a global player. These technological changes include:

- ◆ The company has digitalised all its processes – both general business systems and processes to product production process lines. All these processes and systems can be viewed online at any time. For example, the payroll system is being converted to be stored in the Cloud so it can be accessed anywhere at any time. The same applies to the income statement, while all sick leave or annual leave forms have been digitised as well as expense claims. The same is true for the clocking-in system, which has become a mobile clocking system so that employees across the globe can clock-in on the platform from anywhere in the world.

- ◆ In line with the company embracing various new technologies in the development of its products, it has set up an employee engagement app and all information to employees is communicated via the app as well as via Facebook and email. For example, while the company still has a physical notice board, the notice board has also been digitalised. Employees can log into the app from anywhere and find out about any jobs available in other departments, the latest employment equity reports, and relevant company news. This keeps all employees from the shopfloor to management connected and engaged.
- ◆ The company is using 3D printers not only to design and conceptualise components which form part of assembly lines but also to make parts with the 3D printers which can be included in the overall production process.
- ◆ A virtual design approval process has been introduced for all customer projects. Both the South African and Indian operation have a fully equipped virtual reality (VR) room for an immersive experience of the customer's design. Following the pandemic, the tech teams explored a remote, augmented reality (AR) solution. The company had been using Autodesk Inventor with its own content creation for VR. However, when Google launched an AR experience to blend digital content into the real world, the company created Odin AR – which gives customers the ability to view their designs in 3D in 1:1 scale, take a closer look at the details, and explore different sections from afar. Customers do not need any special hard or software but can access Odin AR via a smart phone with the latest Android or IOS software. Jendamark explains that its design and tech teams create the designs and convert them into AR-ready content. They then generate a link using the cloud service and send it to the customer. All the customer has to do is click on the link and pan across a vacant floor space – and the designs just pop up in front of them.
- ◆ The company is in the process of firming up the interfaces between departments so that the overall production process is seamless.
- ◆ Finally, in terms of the company's commitment to sustainable development, a number of measures have been introduced to "green" production processes. For example, in summer the production process is 90% solar driven.

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The technological changes introduced to its products, as highlighted, include the company expanding its factory in Gqeberha to gear its operations to meet the emerging demand for EVs and developing EV component assembly systems for the electric vehicle market. While its assembly side of the business is constantly evolving to meet the changing demands of the original equipment manufacturers (OEMs), Jendamark has in recent years expanded its digital solution offering to the broader manufacturing sector.



Jendamark is breaking down barriers to online learning with an ed-tech device, powered by Odin Education, that provides a one-stop, affordable digital education solution for South African schools.



The key area of innovation has been building a manufacturing platform which services both sides of Jendamark’s business – its own operations and for its customers. Jendamark’s digital solutions are used in production to solve any challenges and then provide solutions to complex manufacturing problems. This digital solution by Odin Manufacturing is an ecosystem that integrates people, production lines and data and is technologically driven. Naidoo explains that the apps are cloud-based and easy to use. The motivation is about using technology in such a way that “it supports production, reduces human error and assists our customers in being proactive and getting the basics right” by using an integrated platform that centralises a customer’s critical data for ease of analysis and faster, better decision-making. All of this can lead to improved production that, in turn, improves overall product quality in manufacturing. One of the key interventions is Odin WorkStation which is an operator guidance system that provides step-by-step animated instructions for assembling complex parts and uses augmented reality add-ons such as smart glasses. Other Odin Manufacturing apps include Odin Documentation, Odin Checkpoint and Odin Raven. For example, Odin Checkpoint is an online scheduling app that allows customers to assign clear tasks to specific service technicians and issue paperless maintenance instructions for every asset.

Manufacturing and Assembly Manager Marinus Van Rooyen explains that “often these routine tasks, which could improve the overall efficiency, reliability and lifespan of the asset, are forgotten or neglected”. Predictive maintenance yields real benefits, he says, both financial and operational.¹ Odin Raven, a quick and simple way to deploy vibration sensor provides both machine productivity and machine health. This enables customers with online visibility to production outputs and performance. The same sensor, monitors the health of the machine, providing real-time feedback to maintenance departments that enables them to be proactive in preventing breakdowns.

Finally, Jendamark is breaking down barriers to online learning with an ed-tech device, powered by Odin Education, that provides a one-stop, affordable digital education solution for South African schools. The android educational tablet, known as Omang (meaning “identity” in Sesotho), is a fully connected, interactive device that gives learners affordable access to world-class content in the form of educational platforms and apps, videos, and relevant reading material based on their subject choices and interests. Each learner’s device is personalised for them and preloaded with data and supplementary educational content specific to their school’s curriculum requirements – including approved educational websites, and any e-learning platforms or apps they may already be using.

¹ Odin Service allows users to validate normal operating parameters for tools and machines and create manual and automatic alerts when they exceed these limits. In addition, technicians can keep track of consumables, such as oil, used.

IMPACT ON JOBS, SKILLS AND WORK ORGANISATION

In view of the company's focus and drive, the majority (203) of its 372 staff complement at its Gqeberha's operation are considered skilled and are in positions from artisan level upwards. With the move to introducing more digital solutions to improve its product offering, the company's skills profile has begun to change. The company's Human Resource Manager Mariette Geldenhuys explains that while the company still needs and will continue to need artisans (currently has around 90) such as fitter and turners, tool and die makers, electricians and millwrights, the company increasingly needs software engineers, software developers and mechatronic engineers. The company faces some challenges in recruiting software developers as well as software and mechatronic engineers. Some of the skills considerations are:

- ◆ As the company explores the adoption of various forms of digitalisation, there is a need to upskill all staff in relation to digital skills.
- ◆ There is a need for existing artisans to be more analytical and able to analyse 3D pictures as they move from assembly to installation.
- ◆ To develop new technology-driven products, the company is looking for expert mechanical designers, expert assembler artisans, and expert programmers, and they need to be able to work together and effectively "talk to each other".
- ◆ There is a need for people with cybersecurity skills.
- ◆ In view of the new focus of the business, the company is looking for people within graphic design and videography because with the tech age there is more of a focus on visual. Naidoo points out that "people do not want to read a document they want to see visuals".

In view of the company's direction and belief that it has to train its own staff (as the government systems cannot deliver for their specific needs) there is an increased commitment to ongoing education, training and mentoring. The types of interventions include the following:

- ◆ Since 2012, the company has been running its own in-house apprenticeship programme. This four-year programme is approved by the Manufacturing, Engineering and Related Services Sector Education and Training Authority (merSETA) and endorsed by the Department of Higher Education and Training. The company offers apprenticeships in three trades: tool, jig and die making, fitting and electrical. As part of the company's commitment to training artisans and to show the internal staff how important artisans are in the production process, a huge mural (depicting two types of artisans) was painted by a local artist at the entrance of the new assembly hall.
- ◆ As part of artisan development, the company encourages artisans to be more analytical and tries to ensure that artisans rotate and move up from assembly and to installation. The installation division focuses on the programming of machines where artisans need to understand why machines are programmed the way they are. Once artisans move from assembly to installation, some of them can eventually assist in installing the assembly lines at the customer companies.
- ◆ The company also runs a graduate programme in the mechanical design department and graduates are sourced from a range of institutions including Nelson Mandela University. This programme includes a strong focus on building foundational skills and some of these graduates have become supervisors.

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- ◆ Linked to the previous points, the shift in internal education and training is partly linked to technology change but also the profile of the younger employees who lack foundational skills. However, as Geldenhuys explains, technology in and of itself requires some of the foundational skills that are needed, such as communication, writing skills, problem-solving and working in teams.
- ◆ All staff have been on training sessions around what the new technologies mean for their jobs as well as digital wellness workshops.
- ◆ The on-going internal education focuses on technology and the different technologies being used by the company. Geldenhuys explains that Naidoo does educational videos and podcasts. He does Machine Monday which focuses on explaining different machines on the shopfloor, and these can be posted on WhatsApp, Facebook and YouTube, and in emails. Then he does Thursday Thought which focuses on getting people to understand more about what they are doing and why they are doing it.

Finally, in exploring how jobs have changed, both Geldenhuys and Naidoo point out that ongoing technology change has not displaced jobs, instead jobs have been enhanced and the staff complement has grown over the years. Geldenhuys says that many of the tasks are standardised, “because of the different machines there is a different learning experience, and we have to focus on employees moving around the departments so that they can be upskilled”. Increasingly employees are then able to perform more complex tasks. Meanwhile, Naidoo is firm in debunking the myth that technology change makes jobs obsolete. He believes the correct use of new technologies can unlock the human potential and, if applied correctly, “could create jobs” and empower semi-skilled employees to do more and complex tasks.



IMPACT OF NEW TECHNOLOGIES ON THE BUSINESS

The company has evolved from a small operation based in Gqeberha to having a global footprint with a production facility in India and sales offices in Germany and the US because it has what Naidoo calls “taking calculated leaps into the unknown”. Today, Jendamark’s products can be found in close to 20 countries across the globe and over 95% of its products are exported. Jendamark’s business has grown to the point that the company does not only identify itself as a machine builder but as a solution provider as well. The company’s focus on increasingly using digital technologies to deliver more value for its customers, as well as developing new business streams based on new technologies, has meant the following for the business:

- ◆ **The growth of its product offering:** For both the South African and Indian operations, the core business remains the manufacturing of automotive assembly facilities. However, the move towards adopting digital technologies, coupled with the knowledge the company has acquired through developing solutions for its client base, has led to the development of digital solutions which can meet the needs of companies across both developed and developing economies. These solutions are incorporated in the Odin Manufacturing brand. The intention of this offering is to change the paradigm of how technologies are used to solve challenges facing manufacturing companies.
- ◆ **On-going improvement in quality of products:** As a result of the company's focus on "what can we do more effectively in comparison to what we are doing now" has led to an environment where there is a commitment to on-going improvement so as to be a trendsetter. As a result, improvement in the quality of products produced is ongoing. This is coupled with a commitment to continually upskilling employees and the finetuning of systems.
- ◆ **Increased efficiencies:** The company moving to digitalising all its systems and processes, coupled with all data being migrated to the Cloud, has led to improved efficiencies and higher levels of co-ordination. Data migrating to the Cloud has ensured that staff can access data from anywhere. This has improved productivity. The company is still working on ensuring that departments are more "joined-up", and there are various mechanisms in place to ensure increased communication and levels of transparency about the stage of the processes. For example, WhatsApp groups are prevalent across the company and there is the employee engagement app which enables staff to access all important notices and reports immediately as most have smart phones.

Looking at the impact on workers, what has emerged is that workers are encouraged to rotate among the different departments, thereby becoming multi-skilled as well as being encouraged to apply for training opportunities for promotion. The environment encourages learning and, as one employee stated, "this is a great place to learn quickly. Managers and directors trust you with a lot of responsibility which leads to quick growth."

There are numerous examples in the company where unskilled or semi-skilled workers were given the opportunity to receive training and be promoted. For example, a car guard employed by the company is now a Code 10 truck driver. Another car guard showed potential and is now working in the maintenance department as a maintenance assistant. As Geldenhuis points out, "we are constantly trying to identify training opportunities for employees."

FACTORS WHICH ENABLED OR HINDERED CHANGE

In the aftermath of the global financial crisis in 2008, the company took a decision to explore markets outside South Africa as the company realised that it could not rely only on the South African market. Naidoo says that the directors at the time took a risk which has paid off. The company would not be the size that it is today, if not for them exploring new markets and building a brand that is trusted internationally. A key ingredient for this growth, Naidoo says, is the strong technical capability which the company has built up to produce world class products. Today, he says, "we are world leaders in catalytic converters".

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Other key factors which contributed to the transition include among others:

The directors are focused, driven and entrepreneurial: Naidoo explains that the company has always been progressive and "change has always been part of our system – change and technology is how we remain relevant in the business we do, and this is part of our DNA". They are conscious that "standing still means going backwards" especially as they have to provide solutions for the top OEMs.

Getting employee buy-in has been critical: "Half the battle is won" around change and growth when employees buy into the vision of where the company is going. Another factor is that the company is trying to build a culture where workers feel valued and that they add value.

Building strong relationships with customers: Key to developing world-class products has been the approach of staying close to the customers to ensure that the company is "ahead of the curve". The company explains that it is difficult to predict what the product of the future is when the customer itself does not know. Hence, for Jendemark it has been a process of continuous improvement and listening, hearing and understanding customers' needs and where the market is heading. For example, four years ago the company had already started exploring technologies and production lines for alternative energy vehicles and expanded its operation to accommodate this.

Rethinking the user experience: In developing its new product range (Odin Manufacturing), the company took a step back to explore how it could be more customer focused and add to the customer experience. "Rethinking the customer experience was a game changer that led to the company playing in a different playing field." For example, the machines are becoming smarter and more connected, and some customers do not have the necessary skills, hence the solutions developed have ensured the semi-skilled workers can do more complex tasks.

Government support: The company accessed the Support Programme for Industrial Innovation (SPII)² which is designed to promote technology development in companies by providing financial assistance for the development of innovative products and/or processes. The company has benefitted (in earning export credits) and will continue to benefit from the Automotive Production and Development Programme (APDP)³ which now operates within the framework of the South African Automotive Masterplan (SAAM) 2021-2035.

² SPII is focussed specifically on the development phase, which begins at the conclusion of basic research and ends at the point when a pre-production prototype has been produced. The SPII offers two schemes namely, the: SPII Product Process Development (PPD) Scheme and SPII Matching Scheme.

³ The new-look APDP also increases the production incentive benefit to 25% on components. Component manufacturing in South Africa has been less embedded than is the case in automotive industries in other jurisdictions. For this reason, government decided to adjust its incentives to ensure the development of automotive component suppliers, as well as to support those suppliers exporting into automotive supply chains elsewhere in the world.

Challenges the company faced in its transition included the following:

Countering negative perceptions of South Africa and Africa: The company had to counter the negative perceptions among overseas customers about the capabilities of an African-based company. The directors stressed that this was one of the key challenges in trying to break into the international market and, more recently, the company has had to manage the risk and perception “not only that they do not see us in delivering technology solutions for their needs” but now around corruption and loadshedding.

Scarce skills: As highlighted, the skills profile of the company is changing with an increased focus on software engineers, mechatronic engineers and software developers. There are two main challenges. First, to retain good software engineers as they are in demand and often only stay in a job for just under a year. Second, software engineers need to be able to talk to software developers and help them to understand the mechanics behind the apps they are developing. The software developers need to understand the mechanical part of the machines so that they develop the correct platforms.

Managing the electricity crisis: While the company has installed solar and it is able to run its operations in summer largely solar driven (90%), the challenge is the winter months especially with loadshedding at Stage 6. The company has two big generators to overcome that but it comes with other risks.

VISION FOR THE FUTURE

While the company has focused mainly on the international market in recent years, its future plan is to promote its digital manufacturing solutions closer to home to help bring marginalised and underprivileged communities into the South Africa (and African) economy. This, the company believes, could be achieved through Odin Manufacturing. Head of Odin Manufacturing, Juane Schutte, explains that “We are on a mission to accelerate digitalisation in small and medium factories in Africa at a low cost, allowing semi-skilled shopfloor personnel to do much more advanced work. We see human-centric factories as massive opportunities in accelerating skills development and enhancing the economic impact in Africa.” Schutte said that localised manufacturing, using digital tools for on-the-job training, was the answer to the challenging problem of unemployment. Naidoo argues that instead of automating processes that take people off production lines, “we are developing tech to unleash human potential. We call it ‘digital ubuntu’, and believe it is the only way to bring more people into the economy and empower them to contribute to society.”

Naidoo and the Jendamark team believe that the drive in the First World (because of declining populations) is towards automation – doing more with less people. However, for Africa because of its needs, “the focus should be on using technology to do more with more people. If we change our mindset to do more with more people instead of the focus of the North which is to use technology to do more with less people, then our focus should not be on automation but digitalisation. It’s time for Africa to shine... the potential sits right here, we want to unlock huge human potential right on our doorstep.”

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