Applying the Manufacturing Industry's Focus on Automation to a Window Hardware System for Residential and Commercial Application

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INTRODUCTION

Welcome to the fourth industrial revolution, also known as Industry 4.0, which is transforming the way businesses today are operating. It may seem like we've stepped into a scene from Blade Runner, but in actuality, there's nothing dystopian about this era. We're simply transitioning into an age where new technologies are being used to blur boundaries and connect the physical, digital and biological worlds, on a scale not seen before. This means certain practices and processes that involve advanced automation, robotics, artificial intelligence, machine-to-machine communication, data analytics and sensor technology are becoming increasingly prevalent.

WHAT ARE THE BENEFITS OF NEW TECHNOLOGIES ON TODAY'S BUSINESSES?

The Australian Government's Department of Industry, Innovation and Science (DIIS)[1], acknowledges this trend towards smart practices and processes are enabled by a number of key drivers. They include new forms of human-to-machine interaction, such as touch surfaces and augmented/virtual reality systems, rising data volumes and computational power, as well as improvements in transferring digital instructions to the physical world, such as 3D printing.

According to DIIS, the key benefits of Industry 4.0 on today's businesses are two-fold. The first comprises better connectivity between customers and supply chains through real-time access to information, including, for example, the provision of speedy status updates on customers' shipments. And the second involves greater flexibility for businesses to produce differentiated products and services to tap unmet consumer demands, compete in global markets and capture emerging opportunities.

ADVANCING THE MANUFACTURING INDUSTRY IN A NEW ERA

Manufacturing is recognised by DIIS as one of the country's six current industry sectors of competitive strength and priority alongside: cyber security, food and agribusiness, medical and pharmaceuticals, mining equipment, technology and services (METS) and oil, gas and energy resources. Notably, the Australian Government is aiming to drive innovation, productivity and competitiveness within each sector through newly established Growth Centres. These not-for-profit, member-based organisations, each led by a board of industry experts, have been tasked with driving cultural change and unlocking new commercial opportunities. Manufacturing is targeted through the Advanced Manufacturing Growth Centre (AMGC)[2], which is growing rapidly and currently consists of a membership of 940+ organisations and research institutions and represents over 15,000 members. Its purpose is to transform Australian manufacturing to be more globally competitive and generate greater job demand. To this end, it has determined that all manufacturers can and should become more advanced in order to produce products in the least amount of time possible, with minimal waste.

In their recent report Advanced Manufacturing: *A New Definition for a New Era*[3], the AMGC states that Australian manufacturing is larger and more diverse than previously thought, supporting 1.27 million jobs in both its workforce and the inputs it purchases versus the 905,000 jobs currently counted by the Australian Bureau of Statistics. Interestingly, this comes at a time when the manufacturing sector in China is experiencing a slowdown, due in part to the trade war with the US.[4] The AMGC also states that being advanced is not about *what* a manufacturer makes, but *how*, and then outlines the three top characteristics of successful manufacturing around the world (based on an analysis of 3000 global companies).

It surmises that a manufacturer is more advanced when it uses these three characteristics, with the first being advanced knowledge, which occurs when a high degree of research and development is implemented. This is followed by advanced processes, which occur when a focus on using state-of-the-art technology and familiarity with digitalisation is prioritised. And thirdly, advanced business models, which occur when offering niche solutions that are highly customisable and therefore highly valuable are continually explored. Significantly, the adoption of advanced processes allows all manufacturers to embrace technological change and also make smarter use of technology in order to increase efficiency and productivity.

Across the industry, advanced manufacturing is enabling the reinvigoration of a sector that's been dealt a series of heavy blows, including the loss of Australia's automotive manufacturing industry with the closure of Adelaide's Elizabeth Holden factory in 2017[5]. Manufacturers operating with greater capital intensity (the amount of fixed or real capital present in relation to other factors of production, especially labour) are futureproofing their business, which in turn leads to overall economic growth. Indeed, the use of more automation can lead to outcomes that are overwhelmingly positive, with the *Advanced Manufacturing: A New Definition for a New Era* report stating, "…research shows that successful companies have an automation rate on average 1.3 times greater than that of less successful companies"[6]. It also signals the opportunity for upskilling within the current workforce and the creation of different jobs, which will progress the industry as a result of adaptations to operational change.

Automation could bring back manufacturers who previously went off-shore because of high labour costs as well, contributing yet another boost to Australia's economy and highlighting the need for Australian manufacturers to compete on value and not on cost. There has been a lot of discussion on the topic of reinvigorating on-shore manufacturing opportunities within Australia, including a 2018 article for the *Australian Financial Review* by William McInnes, who cites a report by Bain & Company that "…forecasts automation as one of the key drivers of change, creating an economic boom over the next decade and offsetting a slowing in labour force growth[7]". And in a more recent article published by University of Sydney's The Warren Centre, automation is proposed as a "second manufacturing boom for Australia and has the potential to last longer than the mining boom"[8], potentially setting the industry up for a bright future.

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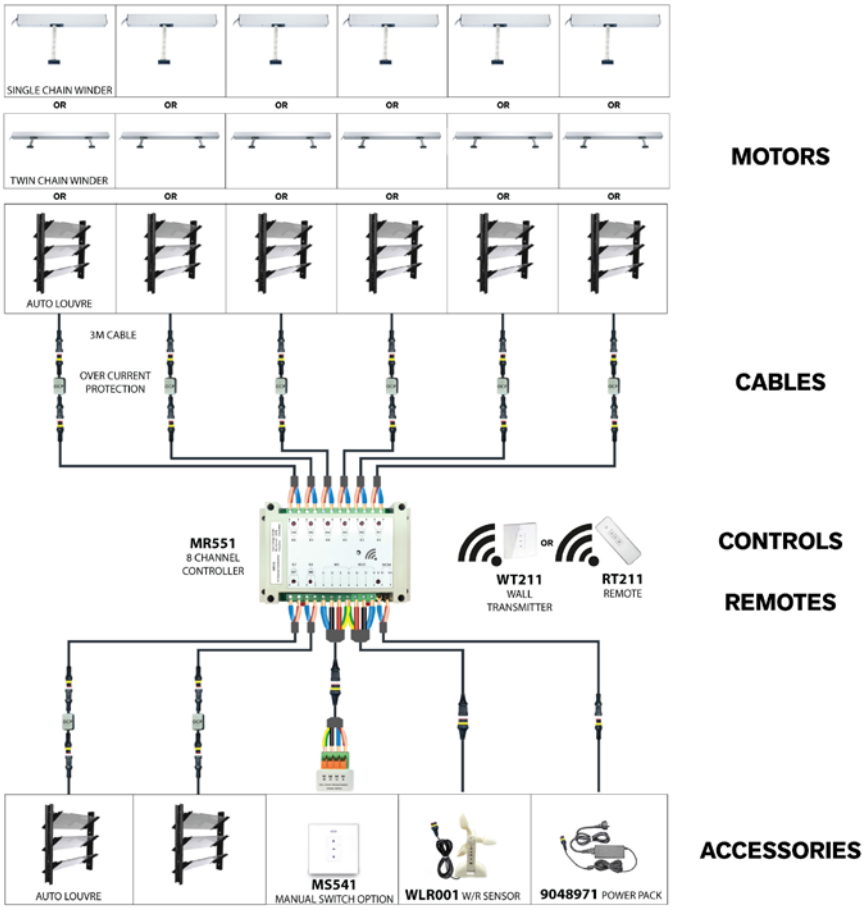

CREATING NEW STANDARDS

Should Australian manufacturers not use advanced knowledge, processes and business models, they will most certainly be a casualty of Industry 4.0, rather than its champion. The risk of being left behind, while other international manufacturers power ahead is very real. As Australia's largest privately owned door and window hardware manufacturer, Doric is one of those businesses that has moved with the times, having adapted and shifted in order to stay ahead of the game in an increasingly competitive products and services market.

An industry leader established in 1972 by founders Ray Long and Roy Alchin, it employs research and development to deliver niche solutions created by using the latest technology. Doric also has a long history of pioneering and innovating products that are still regarded as industry standard today, including the DH3 and DH8 standard hinge (launched in 1982) and the DS401, which was the first ever sliding lockable window lock when it was launched in 1992.

These products and many others all came about because a hole in the market was identified, for which a solution needed to be created. One of Doric's most recent release is the Ventus Plug and Play Automated System that applies the operational processes of factory-based automation to a consumer product in order to deliver the same benefits. In this instance, it fills the void in the market left by existing building management systems and itemised automatic products.

Essentially a simplified 24V control system that allows the use of louvre and awning chain winders to be controlled via wireless controls, the Ventus Plug and Play Automated System consists of a range of controllers, switches and motors all connected via quick connect plugs. It can control up to eight awning, casement or louvre windows at a time and can be used in floor-to-ceiling applications, as well as hard to reach areas. New sensor technology makes it one of the smartest products of its type on the market today and one of its biggest advantages is that it can also be retrofitted to any existing opening or frame system. All of these features make it suitable for small to large residential and commercial applications, where it will be considered an asset.

ADDRESSING MULTIPLE NEEDS AT ONCE

The Ventus Automated Plug and Play System's true innovation lies in offering the end user greater flexibility, simplicity and efficiency, all characteristics that meet the demands of the Asia Pacific and Australian markets, the regions Doric currently services. It doesn't need to be installed by an electrician, so there's no costly outsourcing required by the window fabrica¬tor and the system uses easy to follow colour charts. Further, it offers simple combination wiring plans, as well as wireless wall switches and remotes, and allows configurations that can be easily altered on the spot by simple disconnections.

Automating windows, especially those that are inaccessible by human reach, allows greater control over airflow and temperature, providing passive cooling and ventilation. In climates like Australia and the broader Asia Pacific region, these environmentally sustainable design features are necessary in order to make living spaces more comfortable, while minimising costs usually associated with running air flow units, thus reducing energy consumption and shrinking one's carbon footprint. The Ventus Automated Plug and Play System's optional wind, light and rain sensors offer further remote control over the internal temperature and through the use of the optional humidity and AC sensors, windows close once the air conditioning is activated. Alternatively, if the room reaches a predetermined temperature, these sensors activate the windows and allow airflow to cool the space down.

Installation of the Ventus Plug and Play Automated System began in the Philippines in 2018, with installations soon to follow in Fiji and Australia, specifically in Darwin, Cairns, Townsville and the Gold Coast. The product has been tested to Australian Standards and the lifecycle of the hardware is for the life of the building. It was recently awarded Most Innovative Window System at the AWA-AGGA Design Awards 2019.

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