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Singapore CA Qualification Examination

INTEGRATIVE BUSINESS SOLUTIONS

ADVANCE INFORMATION

4 December 2023

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WARNING

Candidates **must not under any circumstances** contact any similar company or its agents to obtain research data, and they must use **ONLY PUBLICLY AVAILABLE INFORMATION**. Under no circumstances should they seek to use unpublished or private information.

Dear Candidate,

This information package contains the **Advance Information** for the Integrative Business Solutions (IB) module final examination to be held on **4 December 2023**. A checklist of the documents (Exhibits) contained in this information package is provided on the following page. It is your responsibility to ensure that you have received every document listed.

Your task now is to familiarise yourself with this information including analysing the data provided. In addition, you are encouraged to undertake further research to form a holistic picture of the industry and markets in which the case study company is operating, and the general economic and business environment. Diligent preparation is essential for success in the IB Examination. **Guidance on preparing for the IB Examination is covered in your IB Toolkit.**

The IB examination will be conducted using Cirrus. Please download this Advance Information to the hard drive on your laptop and print this Advance Information prior to the examination day. Although you will have full access to the hard drive on your laptop during the examination, you are strongly advised to have your notes and other preparatory workings in **hard copy format**, as well as a standalone calculator that complies with the ACRA's regulations for your examination.

You will also receive additional information from the **Examination Day Documents (EDD)** on the case study company on the day of the IB Examination. The Examination Requirements will be included within Cirrus. Follow the instructions in Cirrus to download the EDD. You are not allowed to print the EDD on the day of examination. The EDD complete the case study scenario and set out the requirements for the report that you are required to write. The IB Examination will be an open-book examination of **4 hours 30 minutes** duration. Your formal report will cover four specified areas, one of which will be to write an Executive Summary. Please note that **only your report commentary (including the assumptions made), appendices, and workings entered in Cirrus on the day of the examination will be marked.**

Avalon Electric Vehicle Limited

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Note: Unless otherwise stated, all dollar amounts (\$) are in Singapore dollars.

History and background of EV manufacturing

Emergence of the EV market

Electric vehicles (EV) have been around for over a century. However, it was not until the 1990s that EV began to appear in the automobile industry due to advances in battery technology and increasing scientific evidence that CO₂ emissions from petrol and diesel powered vehicles was a significant contributor to climate change and other environmental damage. In recent years, there has been a surge in demand for EV, driven by increasing consumer concerns over climate change and the push towards cleaner energy.

The EV industry has grown rapidly, with several key players emerging as leaders in the market. The industry includes manufacturers of fully and hybrid EV, suppliers of batteries and components, charging station providers, and software developers for EV management systems.

Hybrid EV are powered by an internal combustion engine and one or more electric motors, which use energy stored in batteries. Unlike a fully EV, a hybrid EV cannot be plugged in to charge the battery. Instead, the battery is charged through regenerative braking and by the internal combustion engine.

The EV market today

The global EV industry has seen significant growth in recent years due to the increasing demand for cleaner and more efficient transportation. According to a report by the International Energy Agency (IEA), global sales of EV reached a record high in 2020, with 3 million EV sold worldwide, despite the COVID-19 pandemic.

China is currently the largest EV market in the world, with over 4 million EV on the road in 2020. The Chinese government has been promoting the use of EV as part of its efforts to reduce air pollution in its major cities.

Europe is also a growing market for EV, with countries such as Norway and the Netherlands having the highest EV adoption rates in the world. In 2020, over 1.3 million electric cars were sold in Europe, with Germany, France, and the United Kingdom being the largest markets.

In the United States, EV sales have been steadily increasing. The state of California has been a leader in the United States in promoting EV adoption through incentives and regulations. Many countries around the world have followed suit with CO₂ reduction “green” initiatives, such as subsidies for manufacturers and consumers of green technologies.

In addition to passenger cars, electric buses, electric pick-up trucks and electric vans are also gaining popularity around the world. Many countries and cities have set targets for transitioning their public transportation fleets to EV in the coming years.

The EV industry has also seen significant investment from major automakers such as Tesla, Volkswagen, and General Motors, who have committed to transitioning their production to EV in the coming years. Furthermore, the development of new battery technologies and charging infrastructure is expected to further accelerate the growth of the EV industry in the future.

The global EV industry has been supported by government policies and incentives aimed at promoting the adoption of clean energy vehicles. In many countries, there are tax incentives, rebates, and subsidies available for consumers who purchase EV. Governments have also invested in the development of charging infrastructure to support the growing number of EV on the road.

The growth of the EV industry has also led to the development of new business models and partnerships. Companies such as ride-sharing services, electric utilities, and charging infrastructure providers have entered the market to take advantage of the growing demand for EV.

EV sector challenges

The EV industry has also brought about new challenges and opportunities for traditional automotive manufacturers. These companies are under pressure to innovate and transition their production to EV to keep up with the changing market trends. EV require new technologies, supply chains, and manufacturing processes, which present both challenges and opportunities for traditional automotive manufacturers.

Overall, the global EV industry is expected to continue its growth trajectory in the coming years, driven by government policies, consumer demand, and technological

advancements. The industry is poised to transform the automotive sector and contribute significantly to the transition to cleaner and more sustainable transportation.

Despite optimism in the EV market, there are significant challenges for all EV manufacturers as the market and vehicle manufacturing transition from traditional internal combustion engine vehicles (ICEV) to EV and the dependency on fossil fuel energy which has remained high despite the warnings of climate change being known for several decades.

EV market competition and pricing

Approximately 120 new EV models are launched world-wide each year, posing serious competition in an increasingly crowded market. EV require fewer parts in comparison with ICEV manufacturing which therefore creates lower barriers to entry for new and existing automakers. This has attracted new entrants into the automobile market, such as Nio, Rivian and Lucid Motors.

In ASEAN countries, EV adoption by consumers is rising and EV component and battery manufacturers are adapting to respond to the needs of large EV manufacturers. For example, Thailand and Indonesia are already developing into major regional EV component and EV manufacturing and production hubs.

Additionally, the Chinese EV market is the largest in the world and is supplying Southeast Asia with budget-friendly EV models, some of which are price competitive with comparable ICEV alternatives, adding complexity to the manufacturing and pricing strategies of other EV manufacturers around the world.

High EV set up and manufacturing costs, and component supply issues

The set up costs for advanced automotive factories are high, and are higher for new EV manufacturers operating at a small scale which increases the EV build cost per unit. This means many EV manufacturers are currently operating at very low margins or at a loss in order to establish their EV models and brand, on the basis that growth in the EV market will bring future profitability, as traditional ICEV are gradually phased out in the future.

Improvements in battery technology are also forecast to improve significantly in the next 5 to 7 years which will lower production costs. Lower consumer prices will increase EV demand which will help to bring the EV segment to profitability.

The COVID pandemic and global geopolitical uncertainty (such as that triggered by the war in Ukraine) have led to severe supply chain disruptions and component shortages. Aside from the tragic human cost, these events have culminated in rising logistical expenses and complexity which has increased instability in global supply chains for many EV manufacturers, particularly impacting those manufacturers who operate a made-to-order business model.

The longest lead times are currently in the mining industry with shortages and price surges in key raw metals and minerals used in electric battery manufacturing and EV production. Cobalt, lithium and nickel were particularly affected, with lithium prices surging over 700% between 2021 and 2022, and nickel supply tightening. As such, the battery supply chain for EV has been struggling to keep up with increased demand for EV, resulting in production bottlenecks for some EV manufacturers.

The global semiconductor shortage, which began in 2020 when microchip manufacturers shifted focus to consumer electronics in response to market conditions, has also contributed to EV production difficulties.

The cost of supply chain logistics by road has also risen with increases in the price of oil and from pressure the logistics segment is under to transition their fleets of delivery vehicles to cleaner energy to meet carbon net-zero targets.

EV batteries

EV batteries represent approximately one third of the cost of manufacturing an EV, so reducing their size and weight and increasing energy density is key to enhancing competitiveness, as is optimising their component materials and streamlining production.

To this end, a global race is on to develop and commercialize solid-state batteries, which are smaller, lighter and more energy efficient than lithium-ion batteries and hold the potential to transform the EV sector.

Most battery developers, including LiPower, are based in China, which produces three-quarters of the world's lithium-ion batteries and is home to over half the world's refining capacity for lithium, cobalt and graphite.

However, given production bottlenecks stemming from rapid EV growth, compounded by supply chain delays caused by the pandemic and the Ukraine war, battery suppliers have been struggling to keep up with demand. In response, many EV manufacturers are diversifying their supply chain to secure a stable supply by extending supplier relationships with manufacturers in different countries, including ASEAN countries, Europe and the US.

END OF EXHIBIT 1

Electric vehicle manufacturing in Singapore

Singapore has been an active participant in the EV (EV) industry, with the Singapore Government implementing policies to encourage the adoption of EV by motor vehicle consumers.

Why manufacture EV in Singapore?

There were initial misgivings about basing automotive production centres in Singapore, given the relative scarcity of land and high cost of labour. One particular concern was that traditional automotive production in Singapore became commercially unviable.

However, compared with ICEV, EV have a different value chain with more electronic components and fewer mechanical parts. EV production is a high-growth, relatively clean and less land-intensive endeavour than ICEV production, making it a better fit for Singapore's advanced manufacturing ecosystem and logistical advantages.

Singapore offers numerous advantages that are crucial for the EV industry. These include its strong innovation track record, advanced engineering ecosystem, business-friendly policies, stringent IP protections and skilled workforce.

As home to one of the world's busiest ports, Singapore is also ideally positioned to capture growth opportunities in China, South Korea and Japan, which are APAC's largest EV markets, and maintain easy access to the ASEAN's booming EV component and battery manufacturing sector.

Singapore Government support for the EV sector

The Economic Development Board has been actively attracting EV manufacturers to Singapore in an effort to scale the sector and spur the development of autonomous vehicles. The Singapore government has agreed to special dispensations for EV manufacturers in terms of land and rent costs, along with preferential tax benefits and 100% R&D tax deductions.

In addition to restricting some ICEV and requiring all new vehicles to run on cleaner energy by 2040, in 2017 the Singapore Government launched the Electric Vehicle Early Adoption Incentive (EEAI) to encourage the purchase of electric private,

commercial and fleet vehicles. These include up to 45% off additional registration fees (ARF), substantial cash concessions and road tax reductions. The government has also been promoting the use of EV in public transportation, with the introduction of electric buses and taxis.

Under the Land Transport Master Plan 2040, taxi and private hire companies have committed to transitioning 100% of their fleets to cleaner energy by 2040, making this segment a small but important domestic market for EV in Singapore.

Singapore EV manufacturers will also provide vehicles for export to ASEAN members which have pledged carbon net-zero ambitions by 2050 and are setting targets for EV adoption to support this. Participating countries include Malaysia, where EV are targeted to represent 38% of all vehicles sold by 2040, and Indonesia, Southeast Asia's largest economy, where EV are targeted to represent 100% of all cars and motorbikes sold by 2050.

The Singapore Government has also taken steps to address the lack of charging points and EV maintenance services. Singapore updated its EV charging standards and is actively expanding its charging network through the Land Transport Authority (LTA) and various private companies. To upskill the local workforce, the LTA is also partnering with SkillsFuture Singapore and Workforce Singapore to introduce new training courses and certification programmes on EV maintenance and safety.

Dampening demand factors in Singapore

EV comprised of just 0.56% of Singapore's total car population as of November 2022. Whilst this represents an opportunity, EV represented only 11.7% of all new vehicle registrations in 2022. Slow EV adoption poses a challenge to EV sector profitability in Singapore as significant export costs must be factored in to transport EV to international customer markets.

The main factors attributed to slow EV adoption include the following:

- **High cost of car ownership in Singapore:** One of the key reasons for low EV adoption is the high cost of car ownership in Singapore, which is one of the world's most expensive places to buy a car. This is due to the costly certificate of entitlement (COE), which confers the right to own a vehicle in Singapore for 10 years. The COE can exceed the cost of some EV models as it was worth \$81,089

for EV up to 110 KW and \$110,000 for EV above 110 KW as of October 2022. Owners must also pay an ARF to register a vehicle, although this has been slashed by up to 45% for EV owners as part of the government's raft of incentives to drive conversion. EV themselves are also costly to buy, exceeding equivalent ICEV by about 78% in 2020. Some EV can also be more costly to insure than ICEV. However, EV owners save significantly on fuel consumption compared to charging costs over the long term.

- **Singapore vehicle quota system:** The COE process is part of the vehicle quota system, where the number of new vehicles sold per year is capped, and the rate of growth of the annual quota is determined by the government. Also, owners of vehicles can extend the life beyond ten years on payment of a COE premium. The total vehicle quota for 2022 was around 55,000 and this covers both EV and ICEV.
- **Lack of EV charging infrastructure:** Another top deterrent is range anxiety and a lack of sufficient charging points in Singapore, which currently number around 3,000. Private companies have little reason to invest in expensive charging infrastructure given the low adoption rates, and drivers are reluctant to switch to EV without the infrastructure being in place, posing a so-called 'chicken-and-egg' problem. To address this problem, the Singapore government announced plans to establish 60,000 EV charging points by 2030. Since this will amount to an estimated five vehicles to every charging point, concerns still linger about whether this will be sufficient to meet demand.
- **Lack of EV maintenance and repair specialists:** Another factor impeding growth in the EV market is a lack of EV operation and maintenance specialists in Singapore.
- **Transport substitutes:** Excellent public transport, the rise of residences in and around Singapore's central business district and the growth in ride sharing among millennials have also dampened demand for EV.

END OF EXHIBIT 2

Luna Automotive Group: Group structure, EV range and strategic goal

Luna Automotive Group (Luna) is a Singapore-based group which specialises in the manufacturing of ICEV. In 2016, Luna entered the EV market for the first time, with the launch of the City Mini for the Singaporean EV market, as the Board saw an opportunity in the growing EV industry.

Luna is organised into three entities; a parent company, Luna Holdings Limited, and two operating subsidiaries, Luna Motor Cars Limited (LMC) and Avalon Electric Vehicles Limited (Avalon). Each operating subsidiary is run autonomously with its own Managing Director and management team.

The parent company, Luna Holdings Limited, has provided the required financial support for Avalon to develop and manufacture its range of Avalon branded EV, utilising the financial success of ICEV, manufactured and sold by LMC.

The Board of Luna set up Avalon as a strategic response to the likelihood that governments will seek to transition the petrol and diesel motor vehicle industry to renewable energy sometime in the future to counter the impact of CO₂ emissions on climate change.

The Board of Luna is committed to continuing its financial support until 2027, by which time Avalon is expected to be profitable and self-financing, at which point Avalon's financial support model will be reviewed.

Avalon Electric Vehicles Limited (Avalon)

Avalon currently manufactures three EV models which are principally for sale in Singapore under the Avalon brand. The following descriptions of its three EV have been extracted from the group's website which is used to promote its EV models and its petrol and diesel models.

1. **City Mini EV:** The City Mini is the perfect EV for city dwellers who are looking for a compact and efficient mode of transportation. With its sleek design and nimble handling, the City Mini is ideal for zipping through congested streets and navigating tight parking spots. Despite its small size, the City Mini is packed with advanced features, including regenerative braking, a state-of-the-art infotainment

system, and a long-lasting battery that provides plenty of range for daily commutes and errands. With the City Mini, you will never have to sacrifice style, comfort, or convenience for efficiency.

2. **Coupe Deluxe EV:** The Coupe Deluxe is an EV that offers the perfect balance of performance and luxury. With its powerful motor and advanced suspension system, the Coupe Deluxe delivers a smooth and responsive ride that is perfect for drivers who crave a bit of excitement. The Coupe Deluxe also boasts a spacious and comfortable interior that is loaded with premium features, including leather seats, a panoramic sunroof, and a cutting-edge infotainment system that lets you stay connected and entertained on the go. Whether you are cruising down the highway or navigating twisty back roads, the Coupe Deluxe is the perfect EV for drivers who demand the best.
3. **Family SUEV:** The most recent addition to the Avalon range of EV the Family Sports Utility Electric Vehicle (SUEV) is an EV that is designed to meet the needs of busy families who are always on the go. With its spacious and versatile interior, the Family SUEV can accommodate up to seven passengers with room for luggage. The Family SUEV also boasts a powerful electric motor and advanced safety features, including adaptive cruise control, blind-spot monitoring, and lane departure warning, which help keep you and your loved ones safe on the road. Whether you are hauling groceries or heading out on a family trip, the Family SUEV is the ultimate EV for families who want it all.

The City Mini was introduced to the market in 2016 with the Coupe Deluxe following in 2017. Both of these EV models have benefitted from design, aesthetic and performance enhancements since their initial launch. The Family SUEV was introduced to the market in January 2023, and has quickly established as initial customer demand exceeded availability.

All Avalon EV models have the following common features:

- Optimized aerodynamic curved design and flush doors and handles which reduces wind resistance and improves performance and range.
- Air conditioning and coated insulating glass to protect passengers from temperature extremes.
- One-button auto unlocking with an adaptive face recognition security system.

- Rivalling the acceleration and driving control of the best-in-class ICEV.
- Latest ARM designed microchip technology which provides three-screen interaction.
- Avalon driving assistance software which supports navigation, automatic parking, and emergency braking utilising 25 high-precision car sensors.
- Immersive six-speaker surround sound digital music system.
- Large-capacity power battery, meeting the needs of multiple scenarios and long-distance travel.

Avalon currently manufactures three EV models from its state-of-the-art EV design, development and production site situated in the Jurong Innovation District of Singapore, due to the district's reputation as a local specialist in software, manufacturing state-of-the-art components, computer aided design, manufacturing robotics and some 3D printing of components for manufacturing.

EV sales

Luna does not operate its own network of car dealerships. Both LMC and Avalon rely exclusively on selling their petrol, diesel and EV models principally using third-party car dealerships in Singapore with a small proportion of sales with car dealerships in some international markets. This model relies on continued interest from third-party car retailers in Avalon cars and high demand from customers. Whilst this has helped to minimise sales overheads, there is some debate by the Luna Board that this has dampened demand of Avalon ICEV and EV, as larger petrol, diesel and EV manufacturers, such as Toyota and Tesla, tend to invest significantly in car showrooms which exclusively showcase their own range of new cars for sale to the public.

LMC and Avalon customers can only order a new Avalon vehicle via an Avalon-approved car dealership, who will offer a pre-determined range of colours and customisations. Recently, some customers have complained on Avalon's social media that they cannot order a car directly from LMC or Avalon and that its range of customisations is too limited compared with other ICEV and EV manufacturers.

Research and development in EV

R&D constitutes a major ongoing cost given the long and expensive development cycles for EV. The top 20 global EV manufacturers collectively invested \$627.37 billion into EV R&D between 2016 and 2021 in a race to gain a foothold in the EV market in response to the climate crisis.

Avalon has managed to minimise its investment in R&D by avoiding manufacturing its own EV batteries, which represent a significant proportion of EV manufacturing costs. Instead, Avalon relies on third-party EV battery manufacturers for supply and for battery technology development.

Avalon's major investment is R&D in car design and its own patented vehicle control software.

Avalon financing

Finance for Avalon comes from retained earnings generated by LMC that fund loans made available to Avalon by the parent company, Luna Holdings Limited.

EV Warranty and after sales EV servicing and vehicle maintenance

All new Avalon EV are issued with a 5-year warranty which covers the electric motor, gear drive unit and electric power control. This warranty includes an annual service. There is also an 8-year or 100,000 miles warranty on its electric car batteries. All Avalon-approved car dealerships are required to provide after sales servicing and other vehicle maintenance on request by Avalon EV customers under this warranty.

Strategic goal

Avalon is not currently profitable and is subsidised by LMC sales of ICEV. Therefore, Avalon's primary objective is to become profitable by 2025 and achieving a net profit margin before tax of 10% or higher by 2030.

END OF EXHIBIT 3

Luna Automotive Group: Overview of EV manufacture, sales operations and management team

With Singapore becoming a regional powerhouse for advanced manufacturing, Luna chose the city state for its expansion into EV (EV) research and production. As part of a wider strategy to strengthen its foothold in the increasing EV market, Luna established the 250,000 sqm Avalon Assembly Plant in the Jurong Innovation District. This facility comprises a R&D department, a small, state-of-the-art EV assembly plant and internal and external areas for post-production testing.

Avalon operations

Avalon's Singapore EV manufacturing plant has the capacity to produce up to 40,000 vehicles per year and is designed on the principle of lean manufacturing which utilises artificial intelligence and robotics in its vehicle assembly plant to facilitate lower production costs, minimal waste and reduce the lag between customer order, manufacture and customer delivery.

Avalon's manufacturing site was designed in strict compliance with ISO26262 which is the international functional safety standard for the development of electrical and electronic systems in road vehicles. ISO26262 defines guidelines to ensure that automotive components perform their intended functions correctly and minimise the risk of vehicle accidents.

The Singapore assembly plant was designed as a testbed for Luna's experimental production technology. As well as EV manufacture, its secondary aim is to develop manufacturing innovations which can benefit LMC's production facilities and establish new EV manufacturing sites in other territories.

The manufacturing process for EV involves several stages, including the assembly of the electric motor, installation of the battery, assembly of the vehicle, vehicle exterior and interior finishing and vehicle testing.

Product research, development and design

Avalon's research, development and design team focuses on optimising and streamlining the design and assembly process to reach high manufacturing capacity. Avalon's design strategy includes streamlining vehicle architecture, design and

production, thereby limiting the number of separate parts for assembly which both increases EV reliability and performance and reduces EV assembly time.

During EV new model development, Avalon works with a Singapore-based virtual reality (VR) specialist software company to design potential new EV models. Not only does VR significantly reduce development time and cost, but it also enables designers to perform quality control from the earliest stages of development and respond with design changes to rapid changes in the EV market. This allows Avalon to refine design and structure effectively without the need for expensive test vehicles.

EV automated assembly lines

EV assembly is completed at Avalon's Jurong Assembly Plant as all component manufacturing is done off-site and delivered to the Jurong Assembly Plant using Avalon's current supply chain procurement and delivery processes.

Avalon's Jurong Assembly Plant comprises small-scale, highly optimised assembly lines which produce made-to-order EV on demand based on sales orders received from Avalon's approved car dealerships.

The Avalon assembly line uses state-of-the-art manufacturing systems technology to automate Avalon's entire EV production processes, including assembly and welding. Heavy components delivered to the Jurong Assembly Plant are transported across the factory floor by autonomous intelligent vehicles, while robots handle assembly and other repetitive processes. Due to the current technology used at the Jurong Assembly Plant, all EV assembly takes place in a clean room like in the semiconductor industry which is costly for Avalon to maintain.

To facilitate the plant's made-to-order strategy, every single assembly line works on multiple models and customised configurations at once. Assembly robots differentiate between each vehicle using smart tags denoting different specifications.

Body press and paint operations are not viable at the Jurong Assembly Plant at such a small scale, so the Singapore plant imports the EV body and chassis in parts, which are partially constructed and painted at LMC in Indonesia as well as being sourced from other third-party suppliers. These components are then shipped to the Singapore Jurong plant for assembly and welding.

Automation also allows numerous inspections to take place concurrent with assembly. This results in significant time savings and allows for testing to be conducted on the collaborative functions of multiple parts.

This means that Avalon is able to keep the headcount low at the Singapore plant with the help of advanced tools like augmented reality (AR) technology, which run on smart glasses and are integrated with the central control systems. AR-based remote support enables engineers to leverage external expertise using a shared camera stream and AR annotations.

Automation at the Singapore plant extends beyond the assembly lines to the factory's advanced control systems. Using artificial intelligence-based systems, production is continually monitored to diagnose problems and deliver actionable insights in real time. This means problems can be identified and rectified during production itself, rather than during post-production testing.

These advanced manufacturing tools mean the Jurong Assembly Plant is staffed by approximately 40 highly trained supervisors and operators who manage the entire EV production and assembly process to manufacture Avalon models to each customer's specifications.

New EV pricing strategy and marketing strategy

As a small and relatively new entrant to EV market, the Board acknowledges that the price range for Avalon's range of EV is less price competitive than some of its larger EV manufacturing competitors. Therefore, Avalon's pricing strategy is to focus on Avalon's aspirational branding and vehicle design and performance. Avalon currently uses a traditional range of marketing tools, such as printed and digital media advertising.

New sales orders

An approved car dealership will register a new customer sale by completing a sales order request in the web-based Avalon sales ordering system, which all approved car dealerships have access to. The vehicle ordering system has been used by LMC for almost ten years, and has been adopted by Avalon.

The sales ordering system is integrated with the Luna's financial system so that every vehicle sale is automatically recorded as pending delivery. The system is updated once a new vehicle has been delivered to the customer (via the car dealership). The Board is currently considering updating this system due to its age.

A car dealership will earn between 10% - 15% depending on the vehicle model. The car dealership commission rate is deducted from the amount paid by the customer with the remainder paid to LMC or Avalon. The car dealerships mostly apply the Avalon's recommended retail price although dealerships have some very limited discretion on price to incentivise customers where this is considered necessary by the dealership to close a sale.

Unlike some other car manufacturers, LMC and Avalon do not provide any customer finance or leasing options. Instead, car dealerships may work with their own affiliated finance providers to provide customer finance.

LMC and Avalon recognise only the amount paid by a car dealership for a new vehicle in its management accounts and financial statements. These exclude all COE premiums as these payments are a separate arrangement between the car dealership and the customer.

Avalon supply chain management

Avalon has a supply chain that includes suppliers of raw materials, components, batteries and logistics providers for the transportation of finished goods. Supply chain management has made it possible to reduce some warehousing requirements and further bring down manufacturing costs, although some inventory of commonly used components is held at the Jurong Assembly Plant.

All EV component manufacturing is therefore done off-site. Approximately 20% of the components required to construct a completed EV are supplied by LMC using a cost-plus transfer pricing arrangement. The remainder of required EV components are supplied by various third-party suppliers mostly located in South Korea and ASEAN countries such as Thailand, Indonesia and Malaysia. Foreign investment in the manufacturing of batteries and other EV components in these countries is driven by a combination of access to relevant metal and mineral markets and tax incentives for the production of EV batteries, electric motors and electric power control units.

EV batteries represent approximately one third of EV manufacturing component costs. These are procured from specialist EV battery manufacturers as it is not cost effective for Avalon to manufacture its own EV batteries given its relatively small scale of EV manufacturing. Currently, there are no plans for Avalon to commence its manufacture of EV batteries due to prohibitive R&D and start-up costs.

Avalon's procurement team manages all relationships, contracts, new orders and order tracking with its suppliers and works with the manufacturing management team to resolve any procurement issues which arise during the EV assembly, finishing and testing stages.

Whilst the Jurong Assembly Plant utilises state of the art automated manufacturing technology, Avalon's sales system and procurement and inventory systems are not integrated and neither system is integrated with its manufacturing systems or with suppliers. Its sales, procurement and inventory systems are less technologically advanced as these have been inherited from LMC which has allowed Avalon to focus its investment on its EV design and manufacturing systems. Essentially the EV manufacturing system stands alone.

A replacement integrated sales and procurement system has been a high priority for the Luna Board. However, the introduction of EV and then challenges related to COVID-19 have delayed Board action to investigate new IT system procurement and implementation.

Avalon procurement processes

As the procurement and inventory systems are not integrated with the sales system, Avalon's procurement team is notified of new orders by running a daily report at the beginning of the day. New orders for each EV model are loaded into Avalon's automated manufacturing software which delivers a build specification of all components required to complete the EV and when they are required.

The procurement team exports these requirements into the separate procurement and inventory system to determine which components are currently in inventory or have already been ordered but not yet assigned to a specific order. The system then quantifies the remaining quantity to be ordered, the optimal order and delivery time and a suggested supplier.

The procurement team then contacts each supplier to place the required orders. Sometimes, the procurement team needs to contact several suppliers before sufficient volume is found and an order is confirmed. This means there can be several suppliers for the same components, and delivery is based on when the manufacturers can deliver, rather than when the component is required.

The procurement system can keep track of all orders using a QR coding system, where items are tracked and scanned on delivery at the Jurong Assembly Plant.

The inventory system is monitored by operators at the Jurong Assembly Plant and once all the necessary components are available to commence the assembly process, then the manufacturing system is programmed to commence.

Avalon has experienced some challenges in meeting estimated EV delivery dates, particularly due to the late delivery of EV batteries which has resulted in production delays. Production errors and delays due to procurement and inventory problems are minimised by the experience and professionalism of experienced procurement and assembly plant operators but they occasionally do occur.

As a result, Avalon management is currently exploring new ways to optimise its supply chain and manufacturing processes to improve efficiency and reduce costs.

Avalon employees

Avalon employs almost 200 people in Singapore. The main groups are R&D engineers, automotive designers, software engineers, manufacturing managers, supervisors, operators and support staff who work in the procurement team. The R&D engineers and automotive designers work on and refine new models. Avalon software engineers design, develop and maintain Avalon vehicle control systems which are installed in every Avalon model.

The Avalon procurement team manages the EV supply chain and negotiates supply chain contracts. This team includes a legal specialist who ensures compliance with trade agreements between countries from which Avalon sources its components and batteries, and to countries where it sells its City Mini, Coupe Deluxe and Family SUEV models.

The Luna marketing team provides all EV model marketing and consumer research services and also manages the relationship with Luna’s network of third-party approved car dealerships for the sale of LMC and Avalon models.

Avalon also invests in its Singapore-based workforce by nurturing automotive innovation, design and manufacturing talent through internship, employment and formal training programmes for new starters and employees who have been promoted or seek to change their role within Avalon. Such opportunities have been invaluable, particularly for fresh graduates seeking to enter the EV sector, to retain precious employee talent, skills and experience within Avalon and to manage business continuity and succession planning as employees change roles or leave Avalon.

Board of directors and management team

Luna is headed by the CEO, Ms. Jane Tan, who has over 20 years of experience in the automotive industry. Avalon also has a strong leadership team with experience in engineering, manufacturing, and finance.

The Board of Directors for Luna is as follows:

- John Lim Non-executive Chairperson
- Jane Tan Chief Executive Officer (CEO)
- David Lee Chief Financial Officer (CFO)
- Michael Kumar Chief Operating Officer (COO)
- Sarah Koh Chief Marketing Officer (CMO)
- James Ng Chief Technology Officer (CTO)
- Alex Tan Chief Strategy Officer (CSO)
- Liyana Ying Sales and Marketing Director
- Charlotte Loew Human Resource Director
- Grace Lee Non-Executive Director
- Paul Grant Non-Executive Director
- Karen West Non-Executive Director

Management

Each operating subsidiary has its own Managing Director, who reports directly to Michael Kumar, Luna’s Chief Operating Officer (COO).

For Avalon, the Managing Director is Amanda Ng. Prior to joining Avalon in 2016, Amanda was a rising talent in EV research who completed her masters at Nanyang Technological University (NTU) in Singapore and went on to work at Toyota for four years before joining Avalon.

Centrally shared services

Certain supporting functions and operating overheads are shared between LMC and Avalon. The cost to each subsidiary is allocated by Chief Financial Officer (CFO), David Lee, so that each subsidiary's profit and loss statement is an accurate reflection of their operating activities and expense consumption.

Centrally shared services include human resources department, finance, legal and regulatory compliance, IT services, marketing and Luna's senior management team.

END OF EXHIBIT 4

EXHIBIT 5

Management accounts extract for the six-months ended 30 June 2023 and for the six-months ended 31 December 2022

The following is an extract from the Luna six-monthly management reporting pack which is presented to the Board of Luna Automotive Group (Luna) for its subsidiary, Avalon Electric Vehicles Limited (Avalon).

	Six-months to 30 June 2023 \$'000	Six-months to 31 December 2022 \$'000
Revenue (See Note 1)	2,104,099	1,844,071
Cost of Sales (See Note 1)	(2,205,095)	(2,000,816)
Gross Profit	(100,996)	(156,745)
Marketing	(155,303)	(131,075)
Overheads and administrative expenses	(142,277)	(141,429)
Research and development	(148,529)	(119,781)
Loss for the six-months period	(547,105)	(549,030)
EV sold in the period	13,875	13,077

Note 1: Segmental Information

	City Mini \$'000	Coupe Deluxe \$'000	Six-months to 30 June 2023 Family SUEV \$'000	Total \$'000
Revenue	842,052	1,110,212	151,835	2,104,099
Cost of Sales	(807,746)	(1,221,677)	(175,672)	(2,205,095)
Gross Profit	34,306	(111,465)	(23,837)	(100,996)
EV sold (units)	7,107	6,150	618	13,875

	City Mini \$'000	Coupe Deluxe \$'000	Six-months to 31 December 2022 Family SUEV \$'000	Total \$'000
Revenue	772,800	1,071,271	-	1,844,071
Cost of Sales	(762,936)	(1,237,880)	-	(2,000,816)
Gross Profit	9,864	(166,609)	-	(156,745)
EV sold (units)	6,846	6,231	-	13,077

Financial and operating performance statements for the six-months to 30 June 2023

David Lee, Chief Finance Officer:

Avalon's revenue increased during the half year to June 2023 compared to the previous half year to December 2022, mainly due to two factors.

The first factor is the exciting launch of our new family focused EV (EV) model, the "Family SUEV", which has been very well received by the consumers and the media. As at the end of June 2023, we have two months of advance orders already for the next half-year which will keep our assembly teams busy.

The second factor is Avalon increased its retail prices for the other two EV, the City Mini and Coupe Deluxe, by 5% from 1 January 2023, which was necessary to counter the impacts of global supply chain inflation. Our next price adjustment will not be until 1 January 2024.

However, we have faced challenges with rising production costs due to rising supply chain prices, particularly for EV batteries and supply chain issues caused by the lack of integration between our sales, supply chain management and autonomous manufacturing systems.

Where we can, we have mitigated the impact of rising costs to our gross profit margin through working with our main suppliers to negotiate advantageous pricing and taking cost control measures. However, these efforts are only short-term until we can gain economies of scale from increased EV production at our Jurong Assembly Plant.

Sales of the City Mini have continued to increase. High demand for this model is forecast due to its strong brand and its adaptability. Sales of the Coupe Deluxe are a little disappointing despite the high-performance and sleek design of this model. This is not entirely unexpected as we have focused our attention on the launch of the Family SUEV.

I am currently looking at a change to current cost plus transfer pricing system between LMC and Avalon, as LMC supplies approximately 20% of Avalon's EV components. A change could reduce Avalon's production costs and increase its profitability. The tax rate in Singapore is 17% and is expected to remain at this level.

Michael Kumar, Chief Operating Officer:

During this six-months period, we have faced several issues during the implementation of production process for the Family SUEV, resulting in delays and some one-off higher costs, which should settle down in the next half year period as we continue to iron out minor production issues related to new SUEV assembly processes.

We also experienced supply chain disruptions due to the pandemic, problems with recruitment of experienced and skilled EV manufacturing operators due to a shortage of available skilled workers, increasing overtime costs and limiting our rate of production to an extent.

We have received communication from a couple of managers at our approved EV dealerships that some customers have pulled back from confirming a new EV order due to the estimated lead time between order and customer delivery. These customers have instead looked at models from other EV manufacturers.

We also encountered some technical issues with some semi-conductor components used in our control systems, which required reworking and caused some minor delays during a two-week period in October. We have isolated the problem, which was limited to a particular semi-conductor batch and we are working with the supplier so this does not recur. Fortunately, our extensive quality control and EV testing picked up the problem before the vehicles were dispatched to the customer's chosen dealership, which avoided a more costly product recall. We are currently reviewing manufacturing efficiency measures to improve our production efficiency going forward.

END OF EXHIBIT 5

Email from Luna Chief Operating Officer regarding ongoing issues with Avalon manufacturing

To: Jane Tan, CEO
From: Michael Kumar, Chief Operating Officer
Date: 18 October 2023
Subject: Ongoing Issues with Avalon Manufacturing

Dear Jane,

I am writing to update you on the ongoing issues we are facing with the manufacture of our EV. We have been experiencing delays in the supply of battery cells and packs, which has resulted in a backlog of orders and dissatisfied customers.

We have identified several root causes of these issues, including supply chain disruptions, employee absenteeism, recruitment challenges and other issues which have slowed our manufacturing rate. We have been working to address these issues, but progress has been slow.

I recommend that we engage an external consultant to conduct a review of our manufacturing process and supply chain to identify areas for improvement. I also recommend that we invest in additional equipment and resources to increase our capacity.

Please let me know your thoughts on these recommendations.

Best regards,

Michael

END OF EXHIBIT 6

E-mail from Luna Chief Technology Officer outlining the need for a new integrated sales order, supply chain and manufacturing system

To: Board of Directors
From: James Ng, Chief Technology Officer
Date: 20 October 2023
Subject: Need for New Integrated Sales Order, Supply Chain and Manufacturing System

Dear Board Members,

I am writing to update you on the ongoing issues we are facing in our supply chain and manufacturing process. We have been experiencing some delays in the production of our EV, which has resulted in a backlog of orders and dissatisfied customers and some cancelled EV orders.

To address these issues, I recommend that we invest in a new integrated sales order, supply chain and manufacturing system. A new IT system will improve our production efficiency, reduce costs by optimising our supply chain logistics and may even increase our rate of output of finished EV and increase our annual production capacity if the rate of production can be increased at our Jurong Assembly Plant.

The new system will include a sales order app so customers will be able to order directly with us, for the first time. New advanced analytics and automation tools will be available that will enable us to manage our supply chain more effectively and make data-driven decisions. The system will also enable us to monitor our production process in real-time and identify potential bottlenecks before they become major issues.

Please let me know your thoughts on this recommendation.

Best regards,

James

END OF EXHIBIT 7

Round table Luna board meeting minutes on strategic opportunities for EV manufacture at Avalon

Date: 25 Oct 2023 Time: 10:00 am Location: Luna Board Room

Attendees: All executive board members (no absentees)

Minutes

The board discussed the future challenges and opportunities in the EV industry and identified several key trends, including:

- **Increasing demand for EV:** The board agreed to expand Avalon's range of products to meet this demand.
- **Advancements in technology:** The board discussed the importance of investing in R&D to stay competitive.
- **Regulatory environment:** The board agreed to continue to pro-actively monitor developments in EV and related industry regulations and adapt accordingly.

Strategic growth opportunities

Avalon's research and development (R&D) roadmap includes strengthening its EV line-up, enhancing its hardware and software competitiveness, and optimising its manufacturing capabilities.

Electric vehicle product development

To drive market penetration, EV must also achieve performance and cost parity with equivalent ICEV. Here, Avalon is focusing on advancing and optimising electric drivetrain and powertrain technologies. In addition to improving the performance, efficiency and reliability of the electric motor, Avalon researchers are working on reducing costs by reducing weight and volume, as well as optimising manufacturability by focusing on modularity and scalability. To accelerate commercialisation, researchers are also focusing on exploring alternative motor designs that are more efficient to manufacture and to operate.

Advanced vehicle software

On the software side, aside from performance optimisation and safety features for passengers and pedestrians, vehicle networking technology dominates Avalon's R&D activity. This includes developing and enhancing intelligent driving technology, vehicle network platforms and remote intelligent control terminals. By linking vehicles to their cloud platform, Avalon not only delivers connected services, but also collects real-time data such as operating parameters, climate, road conditions, vehicle information and electrical parts information. This helps researchers predict the lifespan of parts and reduce failure rates. It also paves the way for R&D in autonomous driving and intelligent transportation systems.

Rising EV penetration

The global market looks promising, with most major markets registering 50-60% growth in EV sales in recent years. In addition to targeting the EV markets of China, Europe and the US, Avalon is also rolling out strategies to capitalise on the growing EV markets of Southeast Asia.

In Singapore, passenger EV sales are projected to grow 36.9% in 2023 and are forecasted to achieve average annual growth of 14.2% year on year from 2023 to 2031, despite the government freeze on passenger vehicles. Commercial EV sales are expected to register an average annual growth of 28.5% by the end of 2023. By 2031, Singapore's total EV fleet is expected to reach a penetration rate of 27.3%. Consumer sentiment is changing, with 55% of Singaporeans planning to buy an EV as their next car. As many as 66% of Singaporeans are willing to pay a premium for an EV, partly due to the expectation that long-term costs will be lower.

The EV market in ASEAN countries (excluding Singapore) is estimated to grow at a compound annual growth rate of 32.7% by 2028 and to reach 20% penetration by 2025, 50% by 2030 and to outsell ICEV after 2035. Thailand currently dominates Southeast Asia's EV market with an almost 60% share in Q3 2022, followed by Indonesia with 25% and Singapore with almost 12%.

The CEO, Jane Tan, believes growth in Southeast Asia will be a key driver for Avalon's growth in the coming years, in particular, Malaysia, Indonesia, Thailand, and Vietnam. There is growing demand for EV in these markets and some of Avalon's competitors already have a presence in these markets.

Developing Avalon's purpose-built EV platform

Avalon's Integrated Modular Architecture (IMA) will be an exclusive purpose-built EV platform with a standardised chassis, battery system and motor. Once complete, the IMA will significantly reduce build costs by lowering material costs, streamlining production and improving cost efficiency. It also promises superior performance in terms of range, charging time, motor efficiency and cabin dimensions. There are also fewer components involved, streamlining assembly in terms of time and cost.

Marketing initiatives

The Luna Board has agreed to develop a marketing plan for the launch of EV in the targeted Southeast Asian markets, including digital marketing and advertising strategies, and partnerships with local distributors and dealers. A digital marketing plan could include.

- Social media campaigns
- Influencer marketing partnerships
- Display and search advertising targeting users interested in EV and related topics
- Email marketing campaigns targeting leads generated from website visits and events
- Partnerships with local distributors and dealers to include:
 - Joint marketing and advertising campaigns with partners
 - Training and support programs for dealerships to ensure high-quality customer service and technical expertise

END OF EXHIBIT 8

**Email from Luna Sales and Marketing Director, Liyana Ying,
promoting the use of digital marketing techniques at Avalon**

To: Luna Board of Directors
From: Liyana Ying, Sales and Marketing Director
Date: 2 November 2023
Subject: Promoting EV using digital marketing techniques

Dear Fellow Members of the Board,

Following the approval in principle by the Board, I am writing to recommend the adoption of digital marketing techniques to promote our range of EV.

Due to our current high R&D costs and production, it is not effective for Avalon to focus its marketing messages on price. We simply cannot compete on price with the large EV manufacturers. But we do have a range of EV with a compelling range of performance and design features and our EV range benefits from the aspirational Avalon brand name which has been cultivated since our first launch in 2016. Additionally, our international EV manufacturing competitors have established effective digital marketing campaigns.

Digital marketing techniques will help Avalon to differentiate its branding more effectively by pushing our key selling features more interactively with our target market such as the beautiful design and road handling performance of our Coupe Deluxe, the affordability and maneuverability of our City Mini, and our newest model, the Family SUEV which has amazing internal space and layout flexibility when compared with other SUEV in the same class.

The EV market is expected to continue to grow significantly during the next decade and Avalon needs to stay ahead of the competition by more effectively leveraging digital marketing channels to reach our potential customers both in Singapore, in ASEAN countries and further afield.

With the exponential rise in the use of the internet and social media, particularly by Generation Z, digital marketing is now an essential tool for businesses to promote their products and services. By implementing effective digital marketing strategies,

we can increase our Avalon EV brand visibility and reach a wider audience, resulting in higher sales and revenue.

At the next board meeting, I would like to discuss an increase in marketing expenditure together with some reallocation of our traditional marketing budget specifically for digital marketing. This will be used in part to hire a small new team of digital marketing experts. With their expertise, we can create targeted campaigns that are tailored to our audience and achieve our marketing objectives for the Avalon range of EV.

This will not only help us stay ahead of the competition but also enable us to reach a wider audience and increase our sales and revenue.

Liyana

Luna Sales and Marketing Director

END OF EXHIBIT 9

Review of Avalon's Coupe Deluxe from Best Car magazine

The following is an article from a leading car magazine published in July 2022 reviewing Avalon's Coupe Deluxe EV.

“The Avalon Coupe Deluxe is an exceptional EV that offers drivers a unique combination of style, performance, and sustainability. The vehicle’s sleek design and high-performance capabilities make it an attractive choice for image-conscious drivers who are also environmentally aware.

One of the most impressive features of the Avalon Coupe Deluxe is its impressive performance capabilities. With a top speed of 180 km/h and a range of up to 400 km on a single charge, the vehicle provides a smooth and enjoyable driving experience that is both efficient and cost-effective. The zero-emissions powertrain means that drivers can enjoy a cleaner and greener driving experience while reducing their carbon footprint.

In addition to its impressive performance, the Avalon Coupe Deluxe also boasts a range of advanced safety features. The vehicle is equipped with a collision avoidance system and automated emergency braking, which work together to help drivers avoid potential accidents and mitigate the severity of any collisions that may occur. These safety features provide drivers with greater peace of mind, making the Avalon Coupe Deluxe a safe and reliable choice for drivers of all experience levels.

Overall, the Avalon Coupe Deluxe EV is a strong contender in the coupe sector, offering drivers exceptional value for their money. With its sleek design, high-performance capabilities, and advanced safety features, the vehicle provides a unique combination of style, performance, and sustainability that compares favourably with other EV in its class.”

END OF EXHIBIT 10

Suggestions for further research

The following resources may be useful when beginning your research into the case study company. As always, the caveat is to read everything with a healthy dose of scepticism and apply professional judgment. Just because an article is on this list, does not give it legitimacy or relevance. All links were active as at 31 October 2023.

EXHIBIT 1

Hyundai: Value chain innovations

<https://www.hyundaimotorgroup.com/innovation/CONT0000000000005049>

McKinsey and company: Improving Electric Vehicle Economics

<https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/making-electric-vehicles-profitable>

Mordor intelligence: ASIA PACIFIC ELECTRIC VEHICLE MARKET SIZE & SHARE ANALYSIS

<https://www.mordorintelligence.com/industry-reports/asia-pacific-electric-vehicle-market>

South East Asia Development solutions: Electric Vehicles, Electronics, and the Digital Economy Drive FDI Flows to ASEAN

<https://seads.adb.org/news/electric-vehicles-electronics-and-digital-economy-drive-fdi-flows-asean>

AIPB: Industry 4.0, Steering the ASEAN Towards EV Manufacturing

<https://iotbusiness-platform.com/insights/industry-4-0-steering-the-asean-towards-ev-manufacturing/>

Global news wire: The global EV battery market

<https://www.globenewswire.com/en/news-release/2021/03/01/2183946/0/en/The-global-EV-battery-market-is-projected-to-grow-at-a-CAGR-of-25-3-from-USD-27-3-billion-in-2021-to-USD-67-2-billion-by-2025.html>

Energy.gov: Electric Drive Systems Research and Development

<https://www.energy.gov/eere/vehicles/electric-drive-systems-research-and-development>

EV dynamics: Internet of Vehicles

<https://evdynamics.com/internet-of-vehicles>

IEA: Electric car sales continue to break records, but mineral supply constraints are looming

<https://www.iea.org/reports/global-ev-outlook-2022/executive-summary>

Vehicle dynamics international: The top 20 global OEMs are going big on EV R&D

<https://www.vehicledynamicsinternational.com/features/the-top-20-global-oems-are-going-big-on-ev-rd.html>

EXHIBIT 2

International Trade Administration: Singapore Industry 4.0

<https://www.trade.gov/market-intelligence/singapore-industry-40#:~:text=Singapore%20is%20the%20regional%20powerhouse,to%20enter%20the%20ASEAN%20region.>

Reuters: Hyundai begins building EV hub in Singapore

<https://www.reuters.com/article/us-hyundai-singapore-idUKKBN26Y0I4>

Hyundai: New innovation centre in Singapore

<https://www.hyundai.news/eu/articles/press-releases/new-innovation-center-in-singapore-to-transform-customer-experience.html>

The Straits Times: Singapore in talks with more electric car companies after Dyson: EDB

<https://www.straitstimes.com/business/economy/singapore-in-talks-with-more-electric-car-companies-after-dyson-edb>

Singapore land and Transport authority: Transitioning to EV

https://www.lta.gov.sg/content/ltagov/en/industry_innovations/technologies/electric_vehicles/transitioning_to_evs.html

Carbuyer: Mega-fast EV charging, swappable batteries: Singapore's updated TR 25 EV standards explained

<https://carbuyer.com.sg/2022-what-is-tr25-singapore-new-ev-charging-standards/>

The Straits Times: \$30 million in rebates given out last year under EV early adoption incentive scheme

<https://www.straitstimes.com/singapore/politics/30-million-in-rebates-given-out-last-year-under-ev-early-adoption-incentive-scheme>

Singapore land and transport authority: Partnering Industry to Grow the Electric Vehicle Ecosystem and Build a Forward-Looking Land Transport Sector

<https://www.lta.gov.sg/content/ltagov/en/newsroom/2022/9/news-releases/partnering-industry-to-grow-the-electric-vehicle-ecosystem-and-b.html>

The Star: Hyundai to roll out first Singapore-assembled cars in first half of 2023

<https://www.thestar.com.my/aseanplus/aseanplus-news/2023/01/11/hyundai-to-roll-out-first-singapore-assembled-cars-in-first-half-of-2023>

EXHIBIT 3

ISO: ISO 26262-1:2011 Road vehicles — Functional safety

<https://www.iso.org/standard/43464.html>

AECOM: JURONG INNOVATION DISTRICT

<https://infrastructure.aecom.com/2019/singapore/jurong-innovation-district>

EV dynamics: Internet of Vehicles

<https://evdynamics.com/internet-of-vehicles>

EXHIBIT 4

Inside EV: Tesla's Production Cost Per Vehicle Is \$36K, Down From \$84K In 2017

<https://insideevs.com/news/610074/tesla-production-cost-per-vehicle-is-36000-usd-down-from-84000-usd-2017/#:~:text=Top%20Videos%3A,came%20from%20cheaper%20battery%20costs.>

The Edge: A peek into the factory of the future

<https://www.theedgesingapore.com/digitaledge/digital-economy/peek-factory-future>

EXHIBIT 6

IEA: Global Supply Chains of EV Batteries

<https://www.iea.org/reports/global-supply-chains-of-ev-batteries>

EXHIBIT 7

PwC: Electric vehicles and the impact on the automotive supply chain

<https://www.pwc.com/us/en/industries/industrial-products/library/electric-vehicles-supply-chain.html>

EXHIBIT 8

Innoserve digital: How to Power-Up Your EV Marketing Strategy with Digital Platforms

<https://www.innoservdigital.com/blog/ev-marketing-strategy-with-digital-platforms/>

Profitworks: Electric Vehicle Digital marketing

<https://profitworks.ca/small-business-sales-and-marketing-resources/blog/marketing-strategy/935-electric-vehicle-digital-marketing-2.html>

EXHIBIT 9

EV software development

<https://www.decipherzone.com/blog-detail/electric-vehicle-software-development>

END OF EXHIBIT 11

END OF ADVANCE INFORMATION