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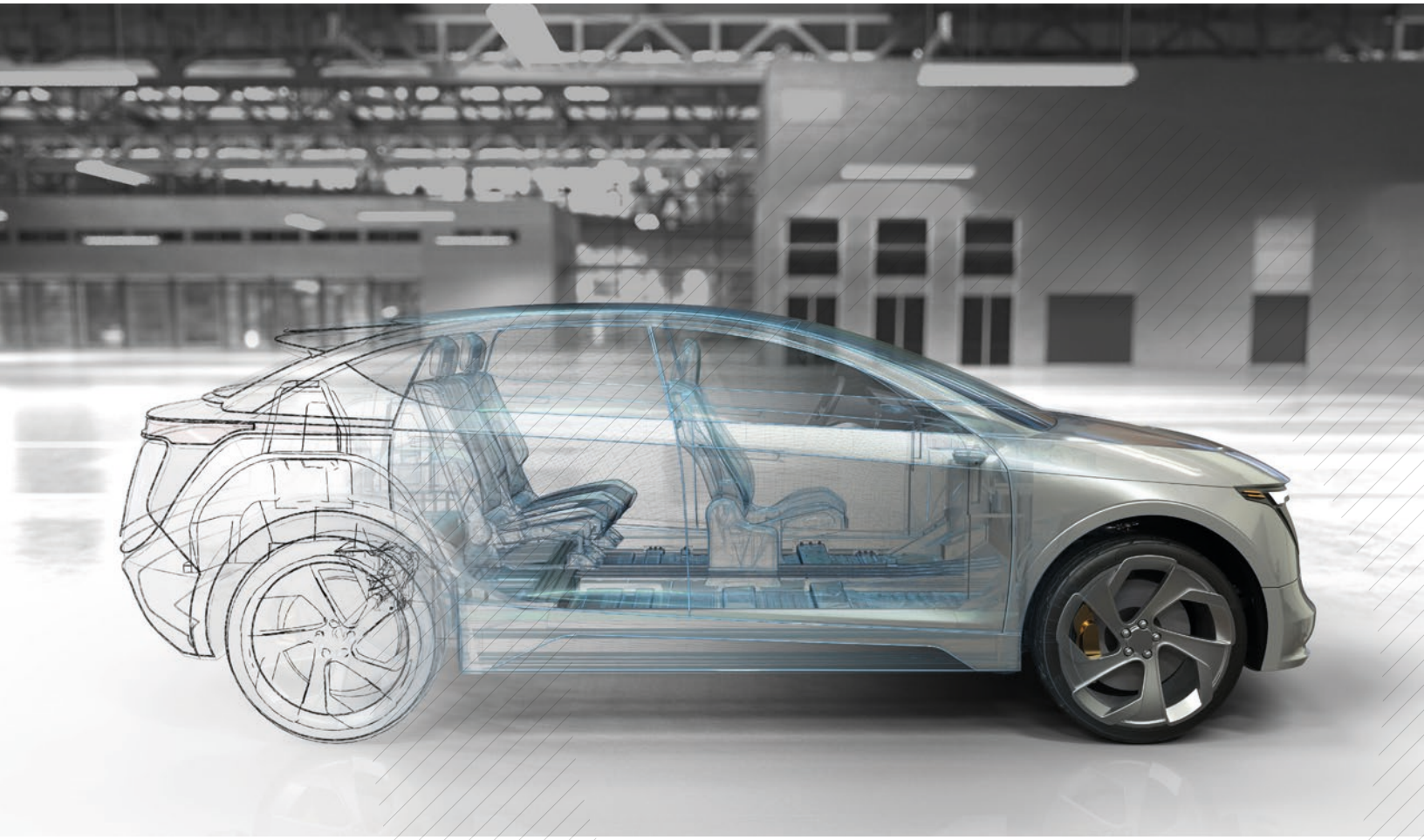

From Startup to Manufacturer:

Electric Vehicle Startup Guide

A Comprehensive Guidebook to Get Your Automotive Vision on the Road

Introduction: The Automotive Market of Today

The world is changing – and so is the automotive industry. Electric vehicles are well on the way to becoming the new standard on our roads, software plays a major role in developing new vehicles, and new technologies are profoundly shaping not only how we use cars, but also how we produce them.

One particularly interesting trend is the appearance of the so-called “new entrants”. These ambitious and confident new players are keen on shaking up the old order of established OEMs and carving out their own niche within the software-driven EV market. And this guidebook is intended to help them with doing just that.

On the following pages, we will broadly cover the road from an automotive vision to a finalized concept. Please keep in mind that this guidebook alone unfortunately can-not guarantee a successful market entry. But hopefully, it will still give you an idea of what to expect on the road ahead to your own automotive vision. With that being said, we wish you a pleasant read!

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Chapter 1: Before Getting Started – 5 Things Automotive Startups Should Consider

The EV market is developing at an astonishing speed – EV market shares continue to grow exponentially, while national incentives and high public interest further motivate players to enter this new playing field. Most importantly, the emergence of EVs has turned many conventions of the existing automotive world upside down. Given the new technological and customer demands, it has never been easier for new players to partake in the automotive world. As such, many ambitious startups and new entrants have appeared in recent years, each trying to find a niche alongside the established names of the automotive world.

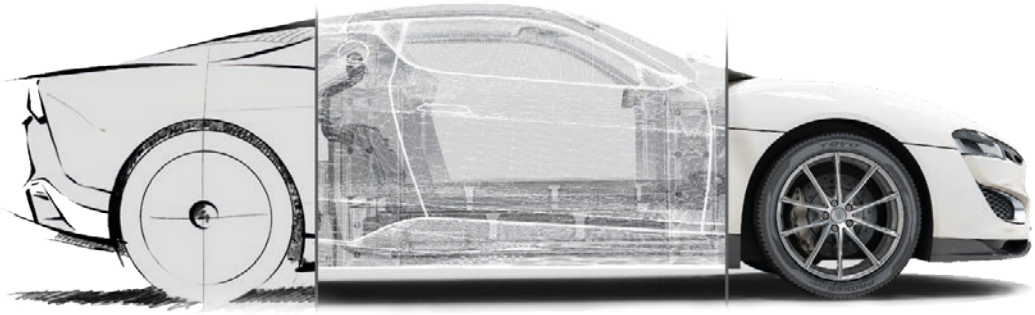
However, just because the EV market has only recently emerged, this doesn't mean that success is guaranteed. New players need to consider several important factors well before market entry in order to get an idea of what exactly the automotive market looks like.

Number 1: The Market for Electric Vehicles is Extremely Contested

Rising awareness about resource depletion and climate change, changing legal requirements, and scientific developments towards greater efficiency, profitability, and affordability are expected to hasten the rapid increase in EV market shares. By **2030**, it's estimated that EVs will possess a global market share of **35%** – by 2040, they will probably overtake combustion engines as the dominant form of transportation, especially in Europe and China.

Number 2: A Clear Product Vision is Necessary for Market Success

Simply building an electric vehicle is not enough to succeed in the EV market. Startups in particular need to devise a **product vision** that shows audiences why both the vehicle and the brand itself provide something unique in terms of features, driver's experience, or specific customer demands. For this, finding and validating a suitable target market through a **market study** is imperative in order to figure out size, demographics, demands, and purchasing power of the startup's future customer base.



Number 3: Partners Will Not Support an Idea Without the Facts to Back it

New entrants unfortunately cannot benefit from a long-standing brand history in the automotive market and will therefore be reliant on external partners to garner expertise, finances, and credibility. However, no investor or partner will risk pouring their resources into a project that solely relies on personal conviction rather than verifiable studies, and conductive research. New entrants need to provide proof that they can organize the necessary environment for vehicle development, find potential partners, investors, and supply networks for their vision, and have a realistic idea of how much time and resources their project demands – as well as what market share it can achieve.

Number 4: Regardless of Your Background, You are a New Player in the EV Market

A new entrant in the EV market will always start from scratch. When pitching the ideas to future partners, investors, and/or suppliers, the new entrant will also present the brand as an emerging player in a sector that has only properly established itself about 5-10 years ago. As such, they will also need to prove their worth as an EV manufacturer whenever they present their vision.

Number 5: Use the Potential – It's Now or Never!

E-mobility is here to stay, and with many players already positioning themselves as competitors within the market, the window of opportunity grows smaller by the day. Simply put: **The perfect time to enter the EV market is now!** Because right now, a new entrant will enter a market that is still in the process of consolidating itself, and there's still ample opportunity to get established as a recognized name in the EV business.

Find out more:
"10 Milestones for Taking Your Car from Vision to Reality"

At this stage, the road ahead has only just come into sight. There are still a lot of miles to cover until an automotive vision becomes reality. But having a clear sight forward and an orderly battle plan at hand are the first major stepping stones on the road to the EV market. But first, it's time to talk about paying for the whole trip.

Chapter 2: Financing the Project – How to Secure Investors for Your Vision

Automotive project are expensive – very expensive. Therefore, finding investors to financially back their project is something every new entrant will have to do at some point. However, many investors will be cautious in terms of supporting a new entrant, given the risks attached to such an action. So, in order to **convince investors of the validity and potential of an automotive vision**, a new entrant needs to have a few important assets ready in their business pitch:

Asset No. 1: A USP That Captivates

There is no successful product or brand strategy without a **USP**. But aside from showing customers the immediate benefit of the product to their lives, it also does so for investors: Why does the market need this product? Why does it promise success in the market? Who is it addressing, and what elevates it from the competition? How does the product intend to stay afloat on the market? And of course: What does the investor get out of it?

Asset No. 2: Comprehensive Knowledge About the Market

Investors themselves may not always be professionals within the vehicle market. However, they do expect their potential business partners to have both the knowledge and the data about all aspects of the product itself, the environment it is released in, and the strategy to establish and maintain the business. Simply, a new entrant must be able to **prove their credibility as a vehicle manufacturer.**

In practice, new entrants should team up with a capable **development & manufacturing partner** in order to garner the insights and resources necessary for conducting market and feasibility studies. The additional benefit of this solution is that a well-known industry name backing the project will automatically raise the new entrant's standing as well – after all, if a prolific manufacturer regards the idea as feasible, why shouldn't the investor too?

Asset No. 3: A Solid Business Case

The **business case** is particularly important for investors: It contains exactly what the new entrant expects from the investors, and how they expect the investors' resources to benefit their project. It also contains a timing plan, which shows the expected development progress and its respective costs at each point of the project, as well as the financing plan, which explains how the new entrant wants to raise the necessary funds. Therefore, both should be formulated as completely as possible.

Asset No. 4: Well-Conceptualized Marketing and Sales Strategies

In general, both the marketing and the sales strategy serve a similar role. They are the core components highlighting the audience's journey through the sales funnel in order to close the "emotional gap" between product and audience, turning them from interested third parties into dedicated customers who identify with the new vehicle brand.

The **marketing strategy** defines the overall direction of the advertising efforts, and sets out the key engagement and communication measures in order to evoke interest for the product in its audience. The **sales strategy** then defines the direct sales efforts towards the target audience, as well as handling the set-up of a sales model and after sales. Essentially, these two strategies are the primary driving forces behind building brand awareness and a stable customer base, and should therefore be well-conceptualized by the time the search for investors begins.

Asset No. 5: Confidence in Your Abilities and Passion for Your Idea

While no prerequisite, investors should ideally show interest for a project beyond its revenue potential. Better yet, if they can also be swept away by the same passion the project evokes for its core team. It should not be underestimated just how important it is for a business pitch to address the emotions of its listener. Because if an investor themselves believes in the project vision, they may prove to be valuable partners and supporters rather than "simply" financing the project.

New entrants therefore need to present the vision behind the vehicle, the emotional incentive of their vision, and the passion behind their project. What idea does this vehicle represent? And why does this dream deserve to be realized? Of course, such a commitment can only be communicated by someone who themselves steadfastly believes in their idea's validity, as well as their own abilities to bring it to realization. Passion and confidence may not be easily quantifiable, but they still serve a large role in convincing investors that this specific vehicle vision is worth their time, resources, and attention.

Asset No. 6: The Perfect Pitch Deck for Investors

The **pitch deck** fulfills a vital role in the search for investors. It provides a concise but comprehensive snapshot of the new entrant's vision for the investor to get familiar with and refer to afterwards. Keep in mind however, that not every pitch deck will be shown in a pitch presentation. While it's certainly the common image of a pitch, in reality, many investors and startups converge with **investment banks** as mediators.

Regardless of how it's pitched, the pitch deck should encompass all of the five aforementioned things, as well as additional information about the product vision, the team behind it, and who else is involved in it.

And even with all of those things in place, success is not guaranteed. Growing a business from the ground up is always an extensive endeavor – and the vehicle market is a particularly demanding one. It may be possible that even with the best pitch deck there is, an investor will still turn down the project if they cannot trust the competence of its presenter. But luckily, the next chapter will highlight an almost surefire way to enhance a project's prestige – one that, in addition, is also a very vital step to move the project itself forward.

Find out more:
"8 Things Every Investor Wants to See"

Chapter 3: Production Planning – Why Development & Manufacturing Partners are a Significant Factor for Your Project's Success

There's no better time to enter the EV market than today – but how, exactly, is a different question. One particular issue revolves around obtaining the necessary…everything. From production sites to suppliers to concept development and production teams, the documentation required for new entrants is very extensive. It makes sense, then, to look for a **development & manufacturing partner** who can provide those things.

3 Areas Where a Development & Manufacturing Partner Benefits the Project

Area 1: Manufacturing Plant Set-Up

Overall, manufacturing plant set-up can be realized in two ways: either by building a completely new factory from scratch (greenfield) or by adapting an existing site (brownfield). **Chapter 6** will take a deeper look into the exact benefits of each option.

For now, it's important to know that either option demands not only purchasing the site and building/adapting it accordingly, but production and organization processes also have to be set up, a workforce has to be attracted and trained, and a supply network needs to be established. Development & manufacturing partners already have those processes and ecosystems up and running. This means that many financial and time demands can be mitigated considerably, as **only adaptations of the existing infrastructures are needed**.

Area 2: Site Selection

Site selection alone encompasses a plethora of tasks. The future site should not only be an economically, legally, and politically favorable area, it should also host suitable suppliers, a capable workforce, renewable energy sources, and ideally as few competitors as possible.

Chapter 6 will get into more detail regarding site selection. In any case, a development & manufacturing partner will greatly aid the site selection process, because they can provide the support and information necessary for determining suitable sites and getting legal and regulatory manners done properly. In addition, the support of a big industry name will also aid in onboarding **suppliers**.

Area 3: Realizing the Vision – From Concept to Serial Production

Finally, there is the matter of **industry knowledge**, which provides a major advantage for any automotive project. Depending on the development & manufacturing partner, many, if not all steps of the development and production processes can be taken over from the startup. This includes the aforementioned factory planning and site selection processes, but also support and experience in validating the vision, complete vehicle and system conceptualization, testing, development, prototyping and finally, serial production.

All of this allows new entrants to not only **focus on building their brand**; it also shortens their time-to-market and reduces risks significantly – two factors which might profoundly impact the success of new entrants within the market.

The Key to a Successful Partnership – What to Look for in a Development & Manufacturing Partner

Now, how to find the right partner. Overall, there are two big groups available: OEMs and brand-independent development & manufacturing partners.

- **OEMs** usually have a more complete service package, often even extending past the serial production stage. However, this usually also comes with considerably tighter presets. As the project will be more closely aligned to a manufacturer operating under their own brand, they will demand more compromises, e.g. in choosing the suitable base car platform (more on that in **chapter 5**)
- Unlike OEMs, **brand-independent development & manufacturing partners** are not actively delivering their vehicle to the end-user. For the new entrant, this means that a vendor network and more importantly, an after sales-service network need to be established independently. On the other hand, working with a manufacturing partner can offer different advantages and greater flexibility. Compartments such as the vehicle platform, supplier networks, and features can be aligned more closely to the new entrant's vision. Also, some development & manufacturing partners such as **Magna** offer a **one stop-shop service** for the entire industrialization process of a vehicle. This means that the new entrant will still receive support throughout the entire process.

The main concern for any development & manufacturing partner is whether the new entrant has a **valid business plan**. As per definition, a development & manufacturing partner is hired with an expiring contract, including the exact time and scope of cooperation – and of course, how much this cooperation will cost.

Cooperating With Development & Manufacturing Partners – Finding the Ideal Work Split

When teaming up with a development & manufacturing partner, there are some topics that need to be considered in order to ensure a successful cooperation. Particularly, the question of who is responsible for what, aka the work split between new entrant and development & manufacturing partner.

The process of determining this **work split** already starts well before the two parties meet with the startup, considering their own demands to a partner via a product requirements document. This should include the following questions:

- What is the current status of the project?
- What are the requirements of the project and product?
- Is the business plan mature, and does it cover all aspects required to ensure a sustainable, long-term business?
- What risks and constraints does the new entrant expect, and how do they plan to address them?
- How do they plan to realize the project from an organizational perspective?

The specifics of the cooperation are specified via documents, such as a RASI* Chart:

MASTER RASI* CHART (Program/Project Level)

POS.	Task List	Partner	Customer	Support Definition
1	PROGRAM MANAGEMENT			
2	MARKETING & SALES			
3	STYLING			
4	PRODUCT DEVELOPMENT			
5	PRODUCTION			
6	SCM (PURCHASING & SQA & LOGISTICS)			
7	QUALITY			
8	INFORMATION MANAGEMENT			
9	FINANCE			
10	AFTER SALES			

*R = Responsible A = Approval S = Support I = Information

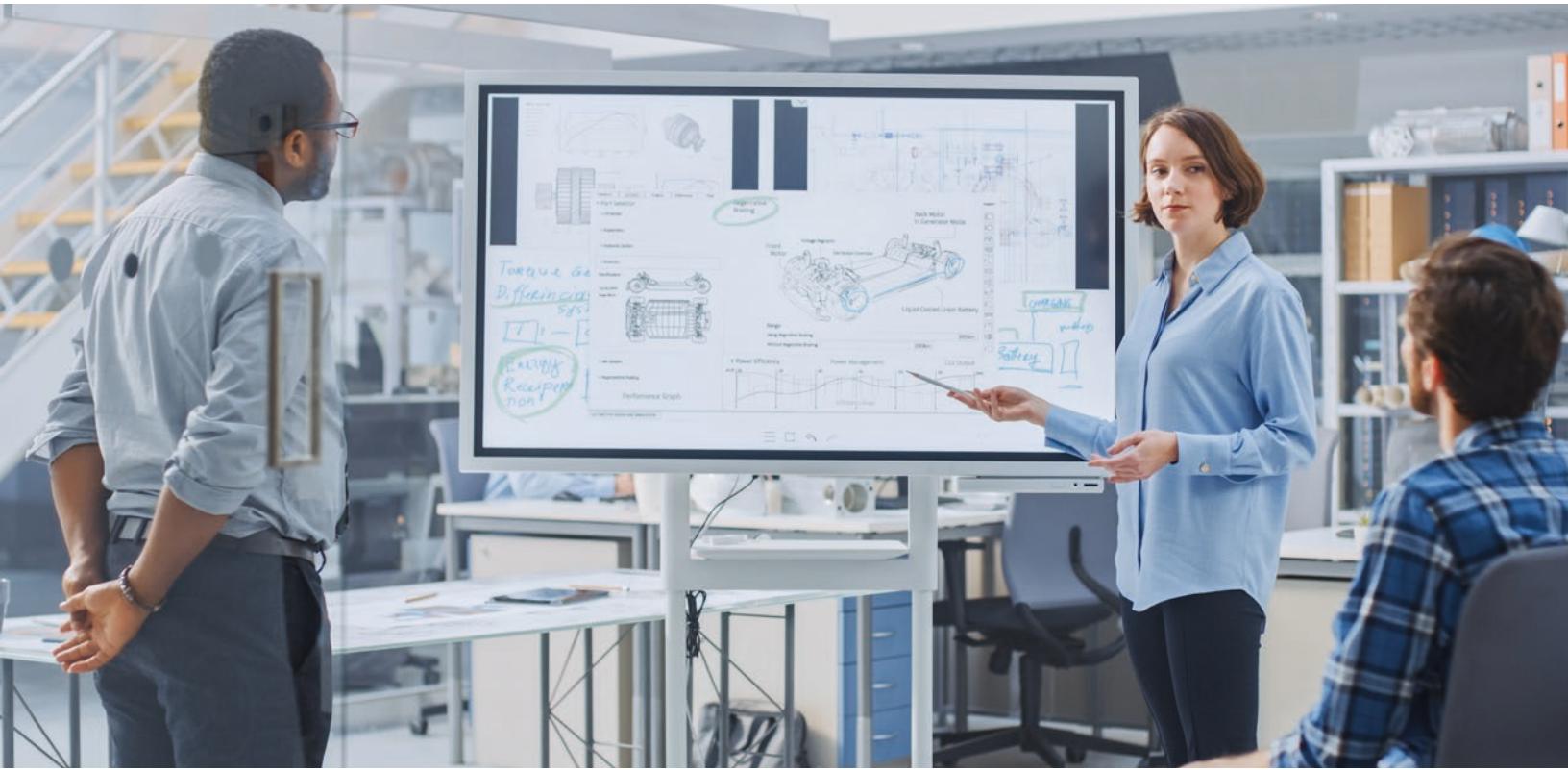
Find out more:
"The 6 Essential Steps to Develop Your Automotive Company"

Generally speaking, **the development & manufacturing partner will handle all key program delivery aspects**, leaving the new entrant free to focus on establishing their brand in the market.

So, Should You Seek a Development & Manufacturing Partner?

Yes! Overall, it is beneficial in many ways to cooperate with a contract manufacturer, as they represent a valuable and experienced partner when it comes to realizing an automotive vision.

With the right partner on board, it is finally time to move the product vision into the next major stage – the **concept phase**! This will be the first time that the vehicle will be shaped into something resembling the final product. However, this step is not easy and requires the development & manufacturing partner and the new entrant to come up with a strategy to match the exponential surge in complexity from there on out.



Chapter 4: Automotive Development Strategy – the Essentials of Good Development Concepts

The main milestones of future vehicle development and production volumes are determined by the time an automotive project enters the **concept phase**. During this phase, the **technical, functional, and economic targets**, as well as the **time schedule** for the vehicle project are defined, validated, and put in place. Overall, it is one of the most comprehensive parts of the complete vehicle development process.

Within this phase, the technical side of the project formally starts with the set-up of an **automotive development strategy**. This strategy covers the overall phases of planning, developing, manufacturing, testing, and validating the vehicle (and its production site).

The Basic Model of Automotive Development

At Magna, vehicle projects are based on the following V-model:

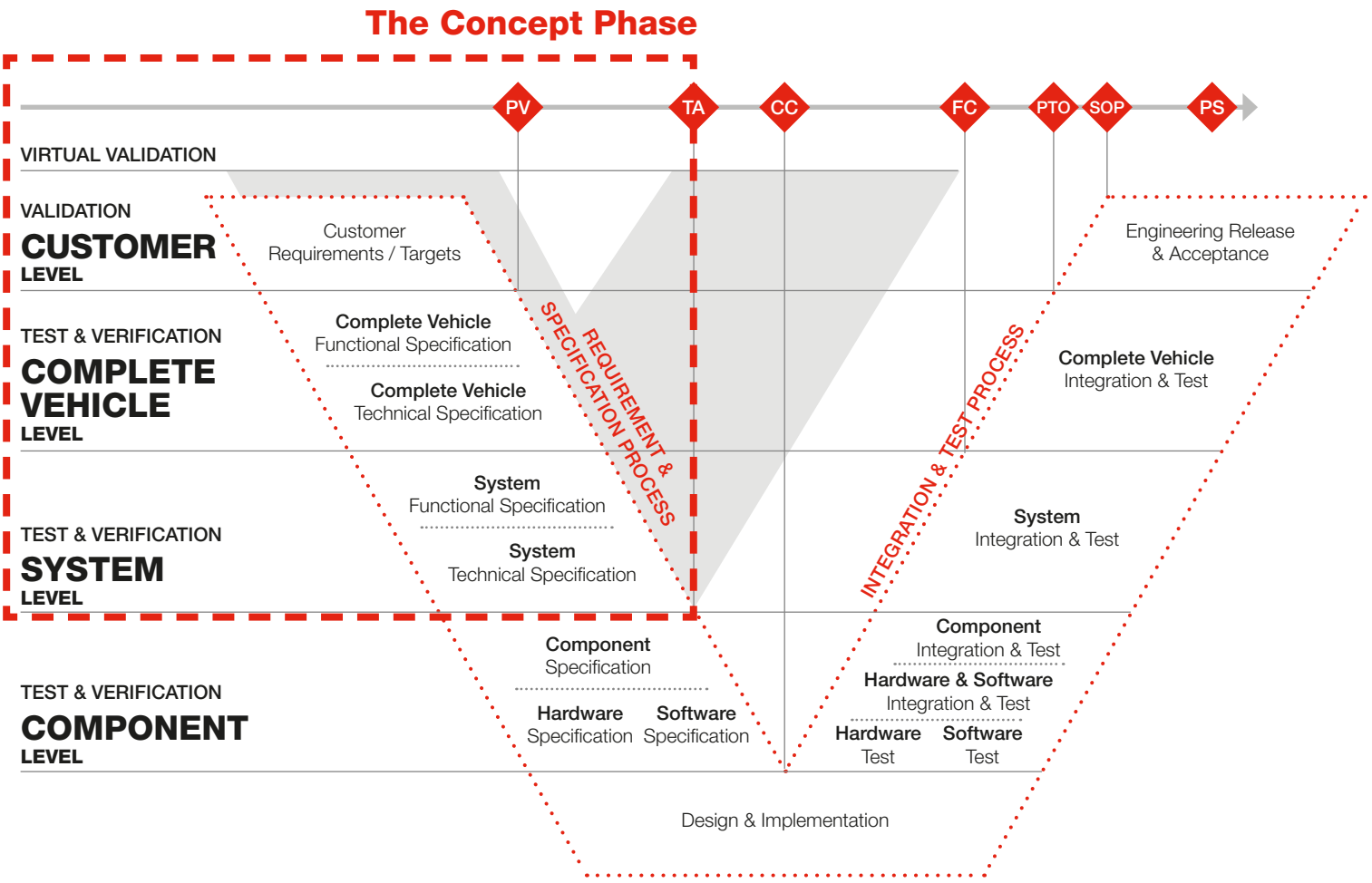


Image: The basic V-model of a vehicle project plan

The left-hand side of the V describes the **requirement and specification process**. Based on the customer requirements, the functional and technical specifications of the complete vehicle, and its systems and components are defined.

The right-hand side of the V is marked by the **validation and test process**. The validated components are integrated – firstly into systems and later into the complete vehicle - before it is finally approved.

Do you want more insights in how we plan our projects? You can find a more detailed explanation of **"Our Project Model for Successful Automotive Projects"** here.

The **concept phase** includes the upper left segment of the V-model. It starts with the creation of the **Customer Market Profile (CMP)**, from which benchmark vehicles and complete vehicle targets are defined. Over the course of this phase, the targets are further specified, until the necessary product requirements for suppliers and the Bill of Material (BOM) can be drawn out. From these, a **Target Agreement (TA)** is made and from there on, all specifications for the vehicle being made are set in stone.

In addition, the business case is updated based on the technical input, with focus on the investments (tooling, plant, supplier development cost, …).

How Do You Ensure a Smooth Project Process?

Several challenging situations can occur during the concept phase:

Challenge No.1: Re-adjusting the BOM

The initial **Bill of Material (BOM)** is devised during the concept phase, and thus based on estimations. As the project progresses, the BOM will require adjustments to the initial estimates, or the addition of parts missing in the original draft. Even minor alterations to the project can change the calculated cost for the business plan. Therefore, new entrants should constantly monitor changes during the concept phase and ensure a clear decision-making process.

Challenge No.2: Keeping Design and Engineering in Balance

The main point of interaction in vehicle development usually forms between the **technical features** of a vehicle and its **design and styling concept**. Technical requirements sometimes limit the creative freedom, whereas design choices demand compromises from the technical architecture. Close cooperation and mutual understanding between the technical teams and stylists helps to find the best balance.

Challenge No.3: The Timely Use of Virtual Testing Tools

Virtual development methods have enabled the testing and validation process to start notably earlier, and subsequently reach a high level of design maturity early in the project. This means that vehicle systems can be constantly and easily updated to meet changing regulations or new challenges, allowing for much higher flexibility, accuracy and cost-/time-efficiency of the project process as a whole – provided that the virtual testing and validation tools are used to their full potential.

Challenge No.4: Finding the Relevant Regulations

The vehicle industry consists of a myriad of different **regulations** for both production sites and the vehicles themselves. Not only do the certificates for quality and security differ depending on the region, but also the way in which they are controlled.

For example, ensuring quality standards in the U.S. is largely managed by the OEMs themselves and will be occasionally checked by officials. Whereas in Europe, the validation process requires OEMs to send in documents for inspection and approval by the inspection authority. Regardless of the final decision, the regulatory framework of the automotive world should be considered as early as possible to avoid last-minute changes.

Challenge No.5: Consistency and Flexibility in Timing

Creating a **timing schedule** requires a deep understanding of the entire vehicle development and manufacturing process to determine how the individual tasks should be organized in the most efficient way. Projects as large as vehicle development will be subjected to numerous delays along the way, and there are many factors a manufacturer cannot control. Therefore, the most important aspect of a schedule is not always how well it can predict certain delays, but rather how it can be adapted to delays without major setbacks. Such adaptations also require quick decision-making and close monitoring.

To Summarize:

A vehicle development strategy can be best illustrated using a V-model. This model is split into a requirement and specification phase, in which customer requirements are specified into functional and technical targets, and a validation and testing phase where the developed components are integrated into the complete vehicle. The concept phase encompasses the upper left segment of this V-model. It starts with creating a Customer Market Profile, from which benchmark vehicles and vehicle targets are derived. Once those targets have been further specified and validated, they are set in a Target Agreement. Issues such as the vehicle BOM, the alignment between engineering and styling, regulatory standards, and especially virtual testing require close monitoring to ensure a smooth project process.

As the concept phase progresses, the automotive vision will gradually develop into a **complete vehicle**. Subsequently, it will also become clear which features and functionalities the vehicle will have. By now, the vehicle will start to materialize – but a good manufacturer would not limit themselves to simply keeping their project restricted to one vehicle. And thanks to the concept of **car platforms**, it is surprisingly easy to turn one vehicle into a complete vehicle series.

Find out more:
"7 Essential Considerations for Your Automotive Concept Phase"

Chapter 5:
Vehicle Platforms – The Importance of a Platform Strategy

Today's automotive industry would not function without **vehicle platforms**. The rise of EVs and other technologies, the ever-growing number of software features, and the need for OEMs and new entrants to create distinct vehicles have all created an increased demand for more and more resources, efficiency, and innovation. A smart **platform strategy** is essential for present and future vehicle developers and manufacturers in order to keep up with the demands of the automotive industry.

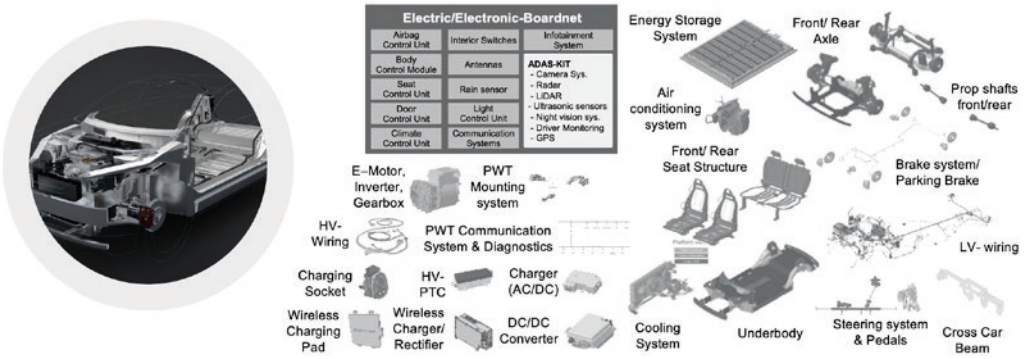
What is a Vehicle Platform?

A vehicle can be divided in two parts: the **platform** and the **top hat**. "Platform" in this sense describes the part of a vehicle that is repurposed in future vehicle models and variants later on. This term is related to (mainly) non-styling specific parts, functions, components, systems, and sub-assemblies with maximum commonality. "Top hat" refers to styling and brand-specific parts. As such, it encompasses all unique components and systems customized for each brand.

EV Platform

Non-styling
specific parts

Components, systems, assemblies and functions with maximum commonality

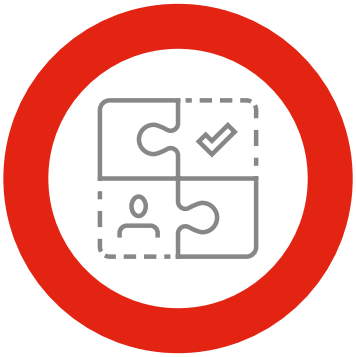


Top-hat

Styling &
brand-specific parts

Unique components and systems customized to each brand

Image: A general distinction between platform and top-hat parts.
Note that the exact line of separation may vary for different vehicles.



This simplified distinction is important because a platform strategy revolves around the question of where to **draw the line between common parts** – or carry-over parts – and **unique parts**. This is defined in the common parts strategy. This distinction allows a vehicle project to grow from simply developing one vehicle to developing multiple models based on one platform.

The Path to Your Vehicle Platform Strategy

A **common parts strategy** allows the vehicle manufacturer to release new vehicles on the market with reduced costs and optimized time-to-market for each model, for several years. However, this requires an increased effort in planning and developing the initial vehicle project, because any adjustments necessary to each model must be considered to ensure a common parts strategy. Therefore, a vehicle platform strategy requires four important steps:

Step 1: Outline the Complete Vehicle

A clear picture of the corresponding complete vehicle is required to draw up the dimensions of a platform. The most important cornerstones include:

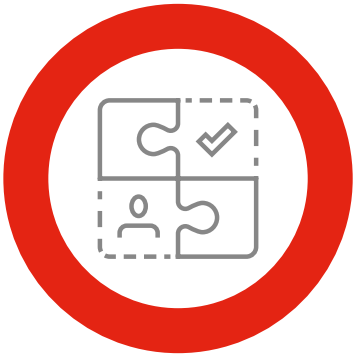
- The **core features** of the vehicle. These features are likely to be shared by all vehicle models – so choosing the core features also means outlining the systems and components that will make up the vehicle platform later on.
- The number of **vehicle variants** planned for release. This number not only determines the number of variations down the road, but also indicates how long the platform should last on the market.
- The segment(s) the vehicle intends to cover (aka its structure) and subsequently its **pricing**. This factor provides a baseline for the degree of modularity required by the platform.

These cornerstones are all derived from the **Customer Market Profile (CMP)**. The CMP answers the previous considerations and shows what exactly a vehicle is supposed to accomplish and which market it is meant for.

Step 2: Arrange All Vehicle Features and Targets

There are two intertwining properties that need to be defined when outlining the complete vehicle: Targets and Features. **Targets** encompass all the metrics and functional requirements a vehicle needs to achieve – those that are empirically measurable or evaluable by subjective perception. Whereas **Features** encompass all requirements set by the customer market, aka everything the final vehicle should have equipped.

These two properties are summarized in the complete vehicle target catalogue and the feature list, which subsequently make up the core elements of the vehicle's **function strategy**. Within a function strategy, all mechatronic (E/E-related) and mechanic (system-related) functions of the vehicle are determined based on the possible range of variants required by the CMP.



Step 3: Define Your Core Vehicle and its Variations

There is still one factor to consider once all features have been defined. Although platform and top hat are considered two separate entities, their individual components overlap too much to be completely separated later on during development. With this in mind, the project needs to decide on one **core vehicle**. This vehicle will be the centerpiece of development, and all subsequent variations are derived from it. The core vehicle will be the first vehicle developed, produced, and launched. It therefore sets the standard for how the platform (and the vehicle series as a whole) is perceived.

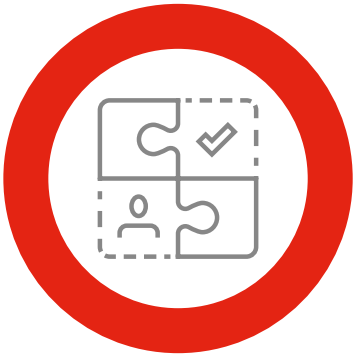
Step 4: Find a Suitable Base Platform, If Available

The last step in finalizing the vehicle platform strategy is finding a suitable **base platform**. For new entrants, **platform sharing** can be a good method of reducing initial costs and time-to-market. And as most modern platforms are **modular** – which means that they are developed in a way so that they can be adapted to a much wider range of deviations – they don't limit a vehicle manufacturer's creativity. Instead, by providing a technical basis, they allow them to focus on the features that make a vehicle unique.

Common Pitfalls While Developing Your Platform Strategy

New players in the automotive industry sometimes underestimate how early they need to **get in contact with component and system suppliers**. Taking care of parts with a long lead time too late can hamper the process of the entire project. Therefore, identifying long lead parts early, and quickly acquiring the necessary suppliers should be on the top of every new entrant's to-do list. The same also holds true for suppliers of core systems/parts of the vehicle.

Finally, there is the chance that sometimes vital steps of the concept phase may be overlooked. A vehicle project must have a clear and definitive strategy, because anything changed or missed after the Target Agreement will have severe consequences on the project and its schedule.



A Few Principles Every Platform Strategy Should Adhere To

There are a few things to consider when laying out the basis for a platform strategy:

- **A Stable Project Foundation**
  By far the most important assurance for working out a sound platform strategy is a flawless foundation. This means that the complete vehicle concept must be treated with utmost accuracy starting from the business case. A clear product vision and a clear CMP must be in place, with both comprehensive and comprehensible concepts derived from them. A complete vehicle requires clear targets – and those in turn, need thorough groundwork.
- **Future Production Scope**
  The platform strategy is a tool to reduce initial costs, and to lay out a long-term roadmap for a vehicle portfolio. It gives vehicle developers the opportunity to release several derivatives on a common technical basis, and scale production volumes. Thus, the subsequent vehicle models benefit from scalability effects, standardized production processes, and a proven supplier network.
- **A Suitable Development & Manufacturing Partner**
  Vehicle development requires tremendous amounts of resources, time, skills, and workforce from the very start – which, particularly for new entrants, often poses the largest barrier before the project even leaves the ground. Teaming up with a development and production partner allows new entrants to gain considerable footing before and during the complete vehicle project.

Ultimately, the platform concept holds an important role in building a sustainable, long-term oriented automotive business. With the automotive industry becoming both more streamlined, but also more diverse than ever before, every startup should utilize the new possibilities of this trend to the fullest. Besides, once a platform strategy has been devised, the final part of our preparatory phase can finally start: **the search for the ideal production site**.

Chapter 6: Production Facilities – Finding the Perfect Site for Your Project

To some extent, the platform marks a milestone in our journey on the road to realizing an automotive vision. By now, the automotive vision itself should be sufficiently defined. The next and final step of this guide will be to get onto the production side of things and look at the **production site** in further detail.

Draw Up Vehicle Manufacturing Plant Setups

First, the requirements and conditions of the plant itself need to be clarified:

The Ideal Production Volume

The first question a new entrant should ask themselves for their plant manufacturing setup is simple: **How many cars should it produce (annually)?** To ensure maximum efficiency, this number is extremely important – and it is arguably the most concept-defining metric of the complete vehicle project.

The reason? Aside from higher material, time, and manpower demands, a greater production volume also makes the project more attractive for suppliers.

Additionally, a higher production volume also changes the degree of **automatization** implemented in the plant setup. If production volumes are higher, then more steps are performed by industrial robots rather than manual labor. Automatization increases productivity at the expense of a more flexible manufacturing line, the latter allowing for more vehicle variants to be built.

How is the Ideal Production Volume Determined?

There are numerous factors that determine the ideal production volume. First of all, it depends on the size and growth of the target market, and on how many competitors already exist within this market. From those metrics, the size, growth and market share, suggested retail price, annual sales, and finally the production volume can be outlined.

Higher or Lower Production Volume?

Many new entrants may still have some difficulties with deciding on a concrete number for their production volume. At Magna, the border between low/mid and high production volumes is at 100.000 vehicles per year annually – quite small for an established OEM, but large enough to require a fairly automatized plant setup.

While this is no definitive recommendation, keep this rule of thumb in mind: **new entrants usually produce in lower volumes.** There are many benefits in terms of cost-efficiency, automatization, and supply networks with higher production degrees. But for many new players, those perks don't justify the vastly higher financial burdens of building a highly automated plant and purchasing the necessary tools needed to produce in large quantities.

Greenfield vs. Brownfield

After the production volume has been defined, the next question about the manufacturing plant setup is how to obtain the plant itself. For this, there are two approaches:

- **Greenfield**, aka building a completely new production site from the ground-up
- **Brownfield**, aka adapting an existing production site to fit the EV startup's needs

Greenfield grants full control over the plant's layout, workforce, technologies, sustainability measures, etc. Brownfield on the other hand mitigates most legal frameworks, requires little production ramp-up, and may also come with an experienced workforce. It's also cheaper to buy a plant than to build one.

For new entrants, **brownfield is usually the way to go**, as the benefits far outweigh the drawbacks from a startup perspective. Given the limitations that EV startups face, brownfield provides the more viable option in terms of time-to-market, cost and ramp-up, and provides a sufficient degree of adaptation if needed.

Choose the Production Site for Your EV Startup

Once the product vision has been defined and validated, its conditions described and the manufacturing plant setup outlined, it's time to move on to the actual **site selection process**. In order to choose the ideal production site, a number of questions need to be addressed:

Which Country to Produce in?

The very first thing to be decided is what **region** the vehicle should be produced in. This construction site is not always in the same region as the vehicle's target market, but in general, it is recommended to settle at least part of the complete vehicle production process in the target market, in order to minimize transport/import costs.

In any case, depending on the country in which the site is located, the project's time and cost conditions will alter significantly. Each country has its own set of permits, laws, taxes, funding programs, and sustainability policies that all factor into how long it takes until the factory can be built. For example, in the US, air permits are required that documents all air pollution activities by the future factory. Those take 6 months to obtain and are required before site construction can begin.

Which Characteristics Should the Site Location Fulfill?

In addition to legal conditions of the country chosen, several other factors play in as well:

- How resilient is the supply chain? Does an existing supplier base exist nearby? How close are railroads, harbors, etc.?
- How frequently do natural disasters, such as earthquakes, coastal flooding or extreme weather conditions occur?
- How economically friendly is the region? Are permits obtained more easily? Do training centers/cooperation programs with colleges exist? Is it part of a free-trade zone?
- Are (renewable) energy sources easily available?
- How can the local workforce be attracted? What working conditions, benefits (e.g., daycare) do they expect? How high is the cost of living in the area?

What Should the Production Site Have?

Finally, the site's characteristics itself must also be considered. In general, those consist of the following seven factors:

Image: The main components and factors relevant for the site selection process.

For a more detailed insight into the important matter of choosing the ideal production site, please refer to the document **"Our Checklist for a Proficient EV Production Site Review Process"** to get a more in-depth look into the many criteria factoring into the choice of the ideal production site.

Conclusion

And with that, our guidebook reaches its end. But don't worry, the journey towards your automotive vision has only just begun. As you have seen, realizing such a vision is a comprehensive and sometimes arduous endeavor – but with a good plan, dedication, the necessary resources, and most importantly, the right partner, it is certainly more than possible to pull it off.

So, what's next? If you are interested in finding out more about the automotive world of today, visit us at **insights.apps-magna.com**. Here, you'll find a constantly updated library of interesting articles and exclusive material we at Magna use for the realization of vehicle projects (such as the checklist mentioned in Chapter 6). And if you're serious about realizing your automotive vision, then contact us at **discovermore.magnasteyr@magna.com**

In any case: Thank you very much for reading! We hope to hear from you soon.

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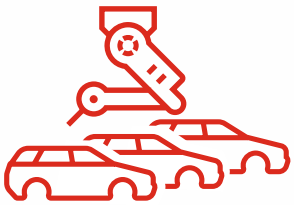

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