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Should US companies in the EV industry nearshore to Mexico or onshore in the US?

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Near and Onshoring

Should US companies in the EV industry nearshore to Mexico or onshore in the US?

Nearshoring
The relocation of business operations to a nearby country to reduce costs while improving control, communication and delivery time

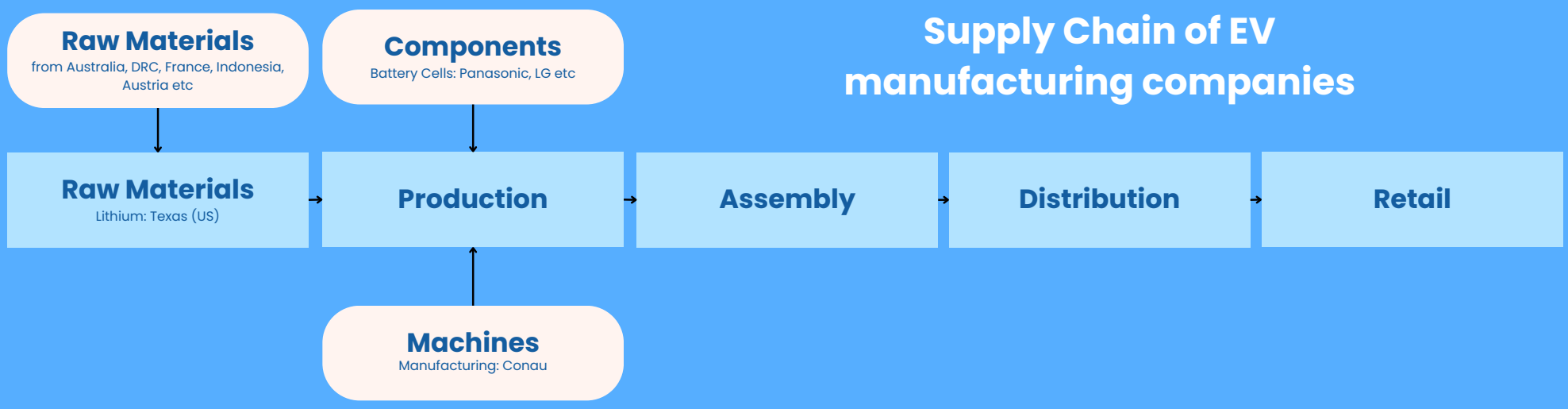
Onshoring
The relocation back to the home country of production and procurement activities that were previously outsourced abroad.

The factors taken into account when considering nearshoring can be applied in reverse to support or oppose an onshoring decision

The automotive sector accounted for 40% of FDI in 2023, with multiple car companies expanding their facilities there

$400 billion in advanced manufacturing investments pledged to create a minimum of 250 million square feet of new industrial projects by 2030, creating 210k jobs

Supply Chain of EV manufacturing companies



Triple Bottom Line as overarching decision making influence

Life Cycle Analysis: Used to evaluate a products environmental impact throughout its entire lifecycle.After defining the scope LCA works by looking at all inputs and outputs in the lifecycle, then by assessing their impact and finally by interpreting it. Transportation emissions have been shown to be a large contributor to environmental impact.

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Environmental Impact Assessment: While the LCA looks at the product, the EIA looks at the environmental impact of a project. This approach takes into account more localised environmental factors, such as the local power grid, local suppliers and local regulations to determine this. Comparing a on shoring and near shoring EIA reveals important environmental differences between manufacturing plants.

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Sustainable Supply Chain Management: SSCM integrates the triple bottom line into established supply chain management theory. Data from the LCA and EIA can be used to determine the types of decisions needed. Supply chain length and complexity often increase the environmental impact of supply chains due to efficiency losses, both of these are impacted by near or on-shoring decisions.

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Main Environmental Considerations to Take into Account

1) Shorter supply chains reduce transportation distance, reducing emissions
2) Shorter supply chains are generally more efficient and reduce emissions
3) Local energy grid may use more polluting energy mix, increasing emissions
4) Less stringent local regulations may increase emissions and environmental degradation
5) Local suppliers may be be less integrated into sustainable practices

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Economic Aspect: Cost-Benefit

Costs

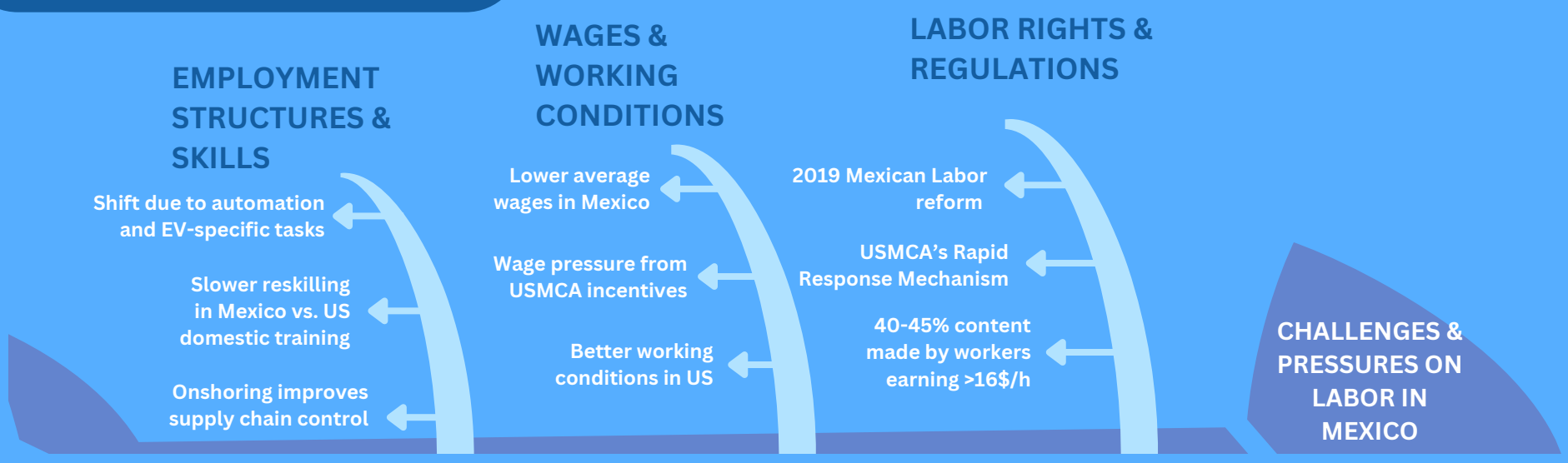
- Legal risk due to weaker legal enforcement mechanisms
- Labour Cost-Efficiency Gap: labour cheaper than in the US but costlier than Asis. Lower skill levels impact productivity per dollar spent
- Added costs from customs handling, potential delays and border congestion
- Security costs
- USMCA Origin Requirements: compliance costs tied to specific local content requirements, affecting eligibility for tariff-free trade. Higher input costs due to the Requirements
- Opportunity cost from loss of US Incentives.

VS

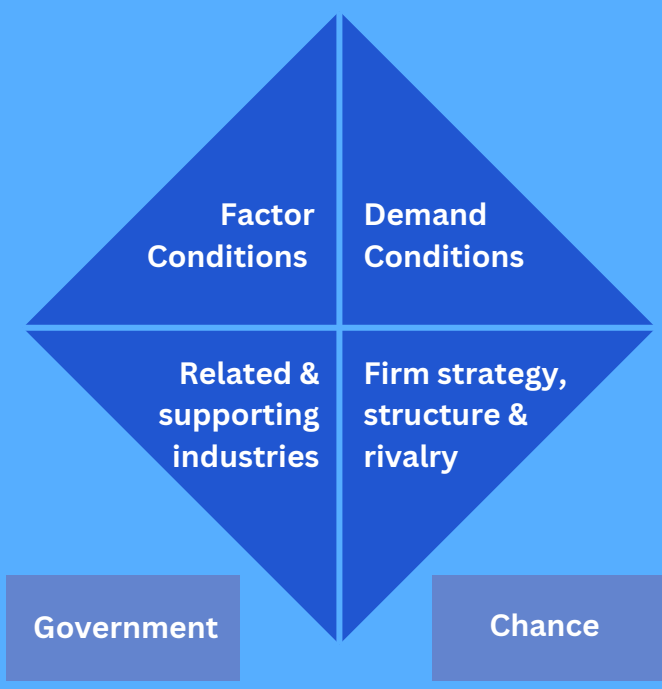
Benefits

- Lower Operating Costs (Just-In-Time and Warehousing)
- Lower transportation & distribution costs improve cash flow
- Lower land acquisition and facility development costs compared to the US
- Government incentives such as Tax incentives.
- Tariff-free Access to US Market
- USMCA

Social Aspect: Cause-Effect Diagram



Competitive Advantage: Porter's Diamond



Factor Conditions
Mexico offers lower labor costs while US offers a more skilled labor force. In terms of energy infrastructure, Mexico relies heavily on fossil fuels

Demand Conditions
US has a large EV market and being closer to consumer base allows agile supply chains compared to Mexico where cross-border logistics come with risk of delay

Related & supporting industries
US has well-developed EV supply chain but Mexico is still lacking a well-established supplier ecosystem

Firm strategy, structure & rivalry
Mexico offers strategic advantages such as lower land acquisition and operational costs. However, weaker legal enforcement mechanisms and political tensions pose risks

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1. Introduction

In today's economy, companies must make more and more innovative decisions to remain competitive. One such decision is to determine the strategy behind the location of the production. There is the possibility of nearshoring, which means relocating business operations to a nearby country. Alternatively, the company could decide to relocate them back to the company's home country after having had them outsourced abroad (Global Negotiator, 2015; Tacto, 2025). This paper will deliberately exclude offshoring and focus exclusively on the United States to limit the scope of the analysis and enhance the clarity of the conclusion. The objective is to determine if an American company should nearshore in Mexico or onshore to the United States. This scenario of nearshoring is increasingly becoming a good alternative, notably because of the rising production costs in the field (Mayer Brown, 2023, p. 2).

To better understand the phenomenon through the lens of the electric vehicle industry, a successful company that is currently expanding will be used as a reference: Tesla. Tesla has recently chosen to nearshore a new Gigafactory near Monterrey, situated in the Nuevo Leon region of Mexico. (Stumpf, 2024). It will then be possible to assess whether it has been a good decision.

A supply chain is defined by the sequence of processes involved in the production and distribution of a commodity. They play a critical role in determining a company's efficiency in general costs and risk exposure. In the electric vehicle industry, they are usually articulated with the extraction of raw materials, the building of batteries, the assembly of each component, and the distribution of the products. The choice of an eventual nearshore will impact the supply chain; most of the time, the decision of nearshoring is taken to improve the supply chain directly. While eventually gaining on costs in a country where the manufacturing price might be inferior. The risks are also present and need to be considered (Tesla, 2023, pp. 103-107).

This paper will use the Triple Bottom Line framework to evaluate this decision more comprehensively. This allows for the evaluation of business decisions under three key pillars. The first one will assess the economic performance of the decision and determine if the company has saved money or is economically efficient. The second pillar will assess the social impact of the decision, taking into account the labor conditions or, more generally, the community's well-being. The third pillar will be about the environmental impact, considering the carbon footprint, the resources used, or the waste produced by the company. Finally, this paper will integrate the insights from all three pillars into Porter’s Diamond Model to evaluate the competitive advantages of nearshoring to Mexico versus onshoring to the United States before the conclusion.

2. Economic Perspective - Cost Benefit Analysis

The Cost Benefit Analysis, conducted to figure out the financial costs and benefits there are to nearshore to Mexico, identified the following main points:

Nearshoring to Mexico comes with a variety of different political challenges specific to the nation. On the one hand, there is a larger legal risk due to a weaker legal enforcement mechanism as compared to the US, this is especially vital when it comes to liabilities and contractual disputes (World Bank, 2020, p. 73). On the other hand, it comes with an increased security cost due to the overall security situation in the nation (Institute for Economics and Peace, 2018).

The establishment of the United States - Mexico - Canada Agreement (USMCA) in 2020 brought with it a multitude of opportunities for companies looking to onshore or nearshore within its territory; however, it also brought new requirements to profit from the USMCA, one of which is the Origin Requirement rules (Office of the United States Trade Representative, n.d.). This comes not only with compliance costs but also impacts the eligibility for tariff-free trade and increases the cost of input material that cannot be sourced within the territory or would be cheaper elsewhere (Office of the United States Trade Representative, n.d.). The production of goods in Mexico instead of in the US adds costs from customs handling and the risk of delays due to border processes and congestion. These factors are less influential than they would be when producing outside of the continent, but they exist nonetheless.

Mexico's unique labor position, being cheaper than the US but costlier than Asia, having more regulations than Asia but still less than the US, puts it right in between two extremes, offering a third option. However, as the workers in Mexico are usually still less skilled than the US workers, there is a labor cost-efficiency gap, meaning the lower skill levels of the workers negatively impact the productivity of every dollar spent (Gereffi & Fernandez-Stark, 2016).

Finally, a lot of US towns aiming to attract international production plants offer companies a wide variety of different incentives to position themselves favorably (Associated Press, 2023; McKinsey & Company, 2019). Nearshoring to Mexico instead of onshoring to the US comes with opportunity costs for those specific advantages.

Nearshoring to Mexico also comes with a variety of different opportunities for EV companies. One of the main aspects is the lower Operating Costs (Just-In-Time and Warehousing) (Investopedia, 2025; TrueCommerce, 2023). The close proximity to such a vital market allows for a more agile supply chain that can be adjusted to current demand faster, decreasing warehouse costs and increasing the possibility and feasibility of Just-in-time production. Additionally, the close proximity decreases transportation and distribution costs. The economic situation in Mexico often brings lower land

acquisition and facility development costs than in the US, making it less expensive to acquire land to develop new production facilities (NAPS, 2020; NovaLink, 2024). Additionally, although mentioned as a cost above, there are government incentives, such as tax incentives in Mexico. Finally, Mexico's participation in the USMCA has allowed it to profit from tariff-free access to the US market. Whether or not that will continue to be the case given the context of today's geopolitical situation will remain open, but for now, this is still a benefit that Mexico can offer to US companies in the EV industry.

This analysis was done to analyze the financial costs and benefits of nearshoring to Mexico. If one inverts the analysis, one can identify the cost and benefit analysis for onshoring to the US.

The electric vehicle company Tesla profits from several of these benefits and is strongly impacted by the costs as well.Their decision to build a gigafactory in Nuevo León and the subsequent order to halt the construction (El País, 2024) shows that at some point, financially speaking, it had made sense to them to add an additional manufacturing unit close to one of their main markets, the US. However, the uncertainty surrounding the geopolitical and especially trade situation around Donald Trump's second election into Office as US president has caused them to reconsider their decision and subsequently halt construction until further notice (Kelly, 2024). Based on this and the previous financial cost and benefit analysis, it would make more sense for US EV companies to move onshore to the US if they continue to have the US as their main market.

3. Social Perspective - Cause - Effect Analysis

After analyzing the economic side, this chapter now focuses on the social perspective, particularly the labor conditions in Mexico, to evaluate whether EV companies should move production there.

From a labor point of view, deciding between nearshoring to Mexico or onshoring in the US involves a complex balance between labor costs, workers' rights, and legal agreements like the USMCA (Martinez & Terrazas-Santamaria, 2024, pp. 1–3).

Mexico offers several advantages. It has a strong and well-established automotive industry, especially in Nuevo León, Coahuila, and Guanajuato, where many EV companies already operate (Martinez & Terrazas-Santamaria, 2024, pp. 1–3). Tesla's interest in building a Gigafactory in Monterrey shows how attractive the region is. One of the biggest reasons is lower labor costs. Manufacturing wages in Mexico range from $6 to $8 per hour, far less than in the US (Martinez & Terrazas-Santamaria, 2024, p. 9). This cost difference has led to a 20% annual increase in foreign investment in Mexican manufacturing since 2019 (Lellouche Tordjman et al., 2024, p. 4).

Additionally, the labor environment in Mexico is evolving. Big labor reforms in 2017 and 2019, as well as the ratification of ILO Convention 98, aim to improve worker protections, such as the right to

unionize and bargain collectively (Marrufo, 2024). These changes introduced a New Labor Model, including better labor courts and a federal agency (FCCLR) to monitor union contracts and democratic practices. These reforms are supported by Chapter 23 of the USMCA, which promotes labor rights (Marrufo, 2024).

The USMCA also includes the Rapid Response Mechanism (RRM), allowing the US and Canada to demand investigations and even impose trade penalties if labor rights are violated at specific facilities. The USMCA also requires that 40–45% of auto content be made by workers earning at least $16 per hour, much higher than the Mexican average wage. This rule tries to raise wages in the region but adds pressure on manufacturers. (LeClercq et al., 2024, p. 19)

Meanwhile, labor costs in Mexico are rising. Since 2019, the minimum wage has increased significantly. In northern Mexico, skilled workers are becoming harder to find, causing more job turnover and competition for talent. If new proposals like a shorter workweek are passed, labor costs could rise another 10% to 20%. (Lellouche Tordjman et al., 2024, p. 2)

On the other side, onshoring in the US supports American jobs and avoids international labor enforcement issues. It also helps Tesla align with US goals of supply chain resilience and reduce dependency on foreign production (Martinez & Terrazas-Santamaria, 2024, pp. 1–3). The Inflation Reduction Act offers incentives for EV production in the US but also demands high North American content in vehicles. Tesla is already investing in domestic battery production to meet these requirements. (Martinez & Terrazas-Santamaria, 2024, p. 9)

However, the US has much higher labor costs, which is a major downside. Another complication is that Chinese EV companies are investing in Mexico, possibly using it as a backdoor to the US market through USMCA access. This could prompt a renegotiation of the trade agreement, affecting Mexico's advantage. (Lellouche Tordjman et al., 2024, p. 2)

In conclusion, Mexico is appealing due to its trained labor supply and extensive costs, but the situation is complicated by growing salaries, labor enforcement issues, and geopolitical threats. Onshoring is far more costly even though it offers higher labor standards. Tesla must weigh the cost benefits of nearshoring against the ethical, legal, and reputational risks of operating in Mexico's changing labor environment. Long-term planning is also made more unpredictable by the changing regulatory environment, both in Mexico and under the USMCA. Although they could improve circumstances, labor reforms and enforcement tools like the Rapid Response Mechanism could also draw more attention. Meanwhile, domestic production is favored by US incentives and strategic objectives, particularly in vital industries like EVs.

4. Environmental Perspective - Sustainable Supply Chain Management

The framework highlighted five considerations that should be taken into account when determining the environmental impact of near- or onshoring.

The life cycle analysis of Tesla Model 3s produced in Shanghai revealed that the entire production process was responsible for three percent of the overall carbon emissions from the car (Gui, 2019, p. 3). The study took into account the "electrical energy, natural gas, and CO2 emissions used during stamping, welding, painting, and final assembly." (Gui, 2019, p. 3). It also took into account the energy used during the battery-making process; however, it did not include transportation emissions, which have been shown to be a large contributor. When looking at the life cycle analysis of Tesla vehicles, the main impact of near- or on-shoring decisions is on the overall distance the product needs to travel as well as the local energy mix for the required electricity (Gui, 2019, p. 3; Fernandez-Miguel et al., 2022, p. 1). This is due to the fact that transportation emissions are often the largest contributor to emissions over a product's lifespan; changing the distances through on- or nearshoring decisions can greatly impact this number (Fernandez-Miguel et al., 2022, p. 1). In terms of the overall supply chain distance from factory to customer production in Monterrey, the overall distance the cars need to travel to reach the customer increases. The Gigafactory in Austin is geographically closer to most Tesla distributors than the one in Monterrey. Secondly, should the Nevada plant be supplying the batteries and supply chains, these would have to travel a further distance to reach the factory and then back into the USA to reach the customer. For the majority of the other parts, "Musk has invited Chinese suppliers to Mexico to replicate the local supply chain at Tesla's Shanghai plant" (Staff, 2024a, para. 2). Moreover, Tesla already buys Mexican-made, Chinese-owned parts for its Austin gigafactory (Staff, 2024b, para. 13). With over thirty suppliers already relocated this points towards a more localized supply chain as opposed to having US parts flown in. Having a shorter, more local supply chain would theoretically reduce emissions due to the increase in overall efficiency (Fernandez-Miguel et al., 2022, p. 1).

Assuming identical factories, only local conditions would change the environmental impact assessment of the plant (Wood, 2014, p. 1). This is due to the environmental impact of the plants being localized. The most impactful of these local factors are the local power grid, local suppliers, and local regulations. California's energy mix was 54% renewable in 2023, Nevada 39% and 22% for Texas (Energy Information Administration [EIA], 2024a, para. 1; EIA, 2024b, para. 4; EIA, 2024c, para. 16). On average Mexico produces 23% of its energy from renewable sources, latest data from Nuevo Leon showed that in 2015 99% of all energy was still being produced through fossil fuels (Fernandez, 2023, para. 2; Pinzon et al., 2015, p. 1). This is significantly more polluting than the other gigafactories. Tesla attempts to solve this issue by aiming to power all of its gigafactories with

renewable energy; however, in the short term, this remains a large issue (Tesla, 2025, para. 10). In terms of local regulations, the USA has significantly more stringent environmental regulations, and they are more enforced compared to Mexico (Cruz, 2024, para. 9) This gives the opportunity for less regulated behavior in Mexico. Tesla adheres to stringent internal regulations, independent of the country, which should counteract the lenient local regulations and ensure best practices. Tesla has decided not to use Mexican suppliers for their Gigafactory and rather has invited their Chinese suppliers to join them in Mexico. Using their Chinese suppliers would ensure that their local suppliers are well integrated into sustainable practices. This is due to the fact that Tesla often uses environmental impact assessments to improve energy efficiency along the supply chain (Zheng, 2024, p. 50). Moreover, Tesla assesses its supplier's adherence to their internal environmental and social standard before integrating them into its supply chain (SEC, 2021, para. 8). Tesla occasionally runs into issues finding suppliers that fit their sustainability requirements, having the Chinese suppliers move to Mexico would ensure that they already have suppliers that meet their requirements.

To summarise, although the decision-making framework favors on-shoring to the US from an environmental perspective, Tesla deals with the potential environmental issues of near-shoring to Mexico well. While little has been done to reduce the emissions increase due to the larger transportation distance, by inviting its Chinese suppliers to Mexico, it effectively deals with the issue of having local suppliers that are not well integrated into sustainability practices as well as ensuring a supply chain that remains as short as possible from a distance perspective. Finally, although compared to their US locations, Nuevo Leon has a much higher polluting energy grid and less stringent environmental regulations, by shifting the responsibility internally and aiming to power their factories through local renewable energy as well as applying their own regulations, Tesla manages these potential issues.

5. Porters Diamond

This chapter combines previous insights by applying them to Porter's Diamond Model. This framework provides a valuable lens through which to evaluate the competitive advantages and disadvantages of nearshoring to Mexico versus onshoring to the United States for companies in the EV industry, such as Tesla.

Starting with factor conditions, Mexico offers cost advantages regarding labor and land acquisition. However, continuously rising wages, talent shortages, and labor-related USMCA stipulations might pose future pressure on manufacturers. In terms of energy infrastructure, a large investment in clean energy is required for EV companies like Tesla to comply with environmental standards, as Mexico still relies heavily on fossil fuels. Nevertheless, nearshoring to Mexico remains attractive due to significantly lower production costs.

Demand conditions tend to favor onshoring to the United States, as the American EV market is one of the largest globally. While Mexico does not offer a comparable consumer base, it serves as a manufacturing hub for export. Mexico's access to the US market through the USMCA allows manufacturers to serve US demand at a lower cost. Nonetheless, proximity to the key demanding market is favorable, as it enables better responsiveness to market changes, and cross-border logistics come with risks of delays and added costs due to customs handling and congestion.

The US offers a well-developed EV supply chain in terms of related and supporting industries. In contrast, although many EV companies are already operating in the country, Mexico appears to lack suitable suppliers for Tesla, as the company is effectively inviting its Chinese suppliers to co-locate in the country. A network of qualified suppliers in Mexico would support a cost-effective and integrated production and the application of sustainable practices throughout the supply chain.

Operating in Mexico offers strategic advantages for US companies, like lower operating costs, close proximity to the US market, as well as Tax incentives and government cooperation. However, weaker legal enforcement mechanisms pose a risk in terms of liabilities and contractual disputes. Furthermore, companies like Tesla risk missing out on US incentives by choosing Mexico and may face reputational risks if labor reforms in Mexico are not fully enforced. The risk of USMCA-related political tensions, not at least increased due to the trade situation around US President Trump's second office term, introduces uncertainty for long-term operations.

Government policies play a central role in on- and nearshoring decisions. The USMCA promotes regional trade but comes with compliance requirements such as rules of origin and labor value content rules. For instance, 40–45% of auto content has to be produced by workers earning at least $16 per hour. Moreover, the USMCA Rapid Response Mechanism, Mexico's 2017 and 2019 labor reforms, and its adoption of ILO Convention 98 show clear steps toward improved labor rights but slowly cause Mexico's former labor cost advantage to diminish.

Finally, chance events like the COVID-19 pandemic and shifting global trade dynamics might impact supply chains and force companies to reconsider moving production closer to or back home. Near- and onshoring emerged as responses to the vulnerabilities of offshoring. Mexico's geographic proximity to the US and growing industrial base make it a relevant alternative for US companies, but ongoing geopolitical tensions and the risk of policy changes still make onshoring to the US a safer long-term option for Tesla and similar firms.

6. Conclusion

The decision to nearshore to Mexico or onshore to the United States involves weighing key factors such as cost, labor conditions, environmental impact, and long-term strategic alignment. Economically, nearshoring to Mexico offers benefits like lower labor and operating costs, cheaper land and facility development, and easier U.S. market access via the USMCA. However, challenges such as legal ambiguity, trade law compliance, and potential border delays can outweigh these advantages. Though more expensive, onshoring to the U.S. provides longer-term stability, access to federal incentives, and fewer regulatory hurdles.

Socially, Mexico's labor reforms and USMCA commitments have improved worker protections and union rights, though enforcement is uneven. Rising wages and competition for skilled labor present new challenges. Onshoring supports U.S. job creation and higher labor standards but comes with significantly higher labor costs.

Environmentally, onshoring is more favorable due to cleaner energy and stricter U.S. regulations. Still, Tesla's strategies, like relocating sustainable Chinese suppliers to Mexico and investing in factory renewables, help offset some environmental drawbacks of operating there.

For Tesla, choosing between nearshore and onshore requires weighing long-term strategy against immediate benefits. Tesla may save expenses, maintain flexibility, and take advantage of a developing industrial base close to the United States by nearshoring to Mexico. Risks associated with this include increased labor expenses, laxer environmental laws, and increased political scrutiny, especially because Chinese suppliers use Mexico as a backdoor into the American market. On the other hand, onshoring gives Tesla a more secure supply chain, enhances its reputation for sustainability and ethical labor, and helps it comply with the Inflation Reduction Act. Onshoring would better meet Tesla's long-term objectives of resilience, compliance, and brand integrity in its largest market, even while nearshoring offers instant financial advantages. Given these considerations, while nearshoring offers short-term advantages, Tesla should prioritize onshoring to the United States to ensure long-term stability, sustainability, and strategic alignment with its core market and regulatory environment.

List of Auxiliary Aids

Tool	**Application**	**Affected passages**
DeepL	Was used to rephrase various sentences. These were not directly adopted, but DeepL was used to find suitable terms.	Whole text
Scribbr	Was used as a tool for the references.	References
Grammarly	Was used to review the language of the text.	Whole text
Chat GPT	Was used for finding synonyms.	Whole text

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We hereby declare that:

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- all parts of the work completed using external resources have been precisely declared;
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St.Gallen, 23.04.2025

Signatures:
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