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From Innovation to Production: A Simulation Case Study of IXOR

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Abstract

This paper is split into two sections where the first focuses on the company performance of IXOR, a simulated automotive manufacturer. The analysis of the firm shed light on the corporate strategy, innovation, and operations management. This section will investigate the performance through simulation data and academic sources to highlight interplay between different functions as well as management decisions. The second section is a personal reflection analyzing two critical incidents which provided significant self-growth opportunities and insight into decision making under pressure.

Keywords: Operations Strategy, Managing a Business, Innovation Management, Teamwork, Strategy in Practice, Self-reflection

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Introduction: Firm analysis

This analysis aims to comprehend the simulated performance of the fictional automotive manufacturer IXOR during a simulation by Industry Masters. The simulation is conducted over six business years to test the transition from internal combustion engines (ICE) to electric vehicles (EV). To analyze the performance, this paper will elaborate on IXOR's overall strategy, implementation, and executions as well as innovation and operations. Firstly, the strategy will be discussed as it provides a deeper understanding of the assumptions behind management decisions and the industry. Secondly, an analysis of innovation strategy and execution will follow to dissect innovation and product decisions. Thirdly, analyzing the operational plan and performance to understand the process from innovation to production. Armengaud et al. (2017) assume that digitalization along product life cycle and supply chain will have a strong impact on competitiveness and business opportunities in the transition of the industry. Therefore, this paper aims to analyze IXOR going from product to production and cast light on the overall transition mainly analyzing three obstacles: operational inefficiency, the failure of hybrid technology and market readiness for EV technology. Lastly, the company performance will be discussed considering real company examples.

Function 1: Strategy

Direction: Setting the stage

The automotive industry 4.0 is driven by political, economic, social, technological, ecological, and legal (PESTEL) trends and characterized by the shift to: autonomous driving, electrification, connectivity, and diverse mobility. Automotive manufacturers are pushed to rethink their business model due to threats such as shifting markets and revenue pools as consumption patterns change, digital purchasing is increasing in popularity as well as declining car sales and vehicle maintenance (Dau et al. 2020). Regulations, tariffs, and CO2

penalties poses threats to Internal Combustion Engine (ICE) as new technologies such as EV, hydrogen and hybrid gain traction (Heineke and Moller 2023). The ICE model is also threatened by geoeconomic tensions, supply chain disruptions, and decreasing battery costs. However, three major constraints scaling EV; difficulties sourcing raw materials, insufficient number of gigafactories producing batteries and lack of public charging stations (Hensley et al. 2022). Digitalization and shifting customer preferences allow new competitors such as software firms to enter the market as the shift from hardware to software requires different skills (*The Economist* 2022). Armengaud et al. (2017) suggest that transitioning into industry 4.0 facilitate new methods for collaboration across the supply chain, establishing value-added networks where actors across the traditional value chain communicate real time. This is because users need the services provided by the value network such as charging stations or access to enough electricity to facilitate mass adaption (Johnson et al. 2017). The attractiveness of the industry as it faces transition has been defined through a five forces analysis, where power of suppliers, threat of new entrants, and the competitive rivalry is high, while power of buyers and threat of substitutes are low (App 1. Table 1). Although for the simulation, the threat of new entry is assumed to be low. Thus, implying that the attractiveness of the industry is medium as the competitive environment is changing.

IXOR's transition started at a crucial moment when it was threatened by a changing environment, a soon outdated fleet, operational difficulties, and expensive debt lead to a need of restructuring (App 1. Table 2). Thus, the strategic direction and objective to be fully electric by Y3 is driven by its purpose "*Leading the change towards sustainable transportation by transitioning to fully electric cars, reducing reliance on fossil fuels, and addressing global challenges of climate change & air pollution*". The values guiding direction were innovation, sustainability, quality and integrity (Industry Masters 2023; David 2011).

Position: Markets and customers

IXOR's customers are upscale markets across Europe, America, and China. The latter has a lower purchasing power; thus, the strategy was to produce and sell a cheaper vehicle in China. Strategies to reach these customers include high attention to customer experience, technology, and sustainability through innovation focus on economies of scope. Thus, positioning IXOR as a differentiation leader, aiming to capture demand with a broad portfolio including SUV's, Executive, convertible etc. to meet customer needs (Fusaro and Hensley, n.d.). Marketing would play an essential role in rebranding the company, and gain traction for EV.

To enable this transition IXOR needed to develop new capabilities, skills, structure, and technologies. Moreover, operations invested in sustainable production improvements, energy, and supply chain to reduce costs and combat challenges and lower emissions in Scope 1 (CO₂ in production), 2 (CO₂ in Energy) and 3 (CO₂ in supply chain). The strategy entailed investing in HR for sustainability training, competitive salaries and managing workload to ensure productive employees and employee satisfaction. The transition was expected to be costly, therefore, the company aimed to finance it through primarily green bonds and issuing shares. Thus, IXOR should monitor the KPI's for Days of Inventory (DOI), Weighted Average Cost of Capital (WACC), Sustainability Rating, Employee Engagement, EBIT, and e-mobility project to keep track of progress.

Executing strategy: Adapting

The overall strategy served as a blueprint for tactical decisions throughout the years, while the direction was slightly adapted. It was necessary to obtain cash to speed up the transition. The first major decision was to issue shares during Y1, to finance expansion alongside green bonds. This facilitated investments in connectivity, autonomous driving, sustainability, and

the launch of a hybrid 4x4H (Hybrid). Launching hybrid was done for diversification and to offer the newest available technology. After weak sales, management realized preferences for it were low and quickly refocused resources on EV development, saving both cash and time. After the initial investments, IXOR struggled to capture demand which caused huge inventories, low revenues- and profits. This can be defined as a valley of death, or innovation curve where there is a gap between current and future financial resources (Gbadegeshin et al. 2022). Management heavily relied on debt and had to reevaluate spending; thus, innovation and sustainability investments were slowed down. Tackling low revenues and profitability was a holistic task. Marketing, innovation, and operations had to optimize by creating desirable vehicles for the right price at lower cost while avoiding huge inventories.

Green financing for customers was introduced in Y2 to boost demand, although it decreased available cash due to a lag in accounts receivable. This made IXOR's products available to a larger customer base and decreased the barrier to acquire a premium brand (JATO 2023). Premium brands experience higher volatility than budget brands for monthly payments (JATO 2023), which supports IXOR strategy to launch the Compact E in Q12, intended as a cheaper fighter brand to increase demand, stabilize production and generate cash. It had up to date features (connectivity: 2, autonomous driving:1 range: medium). The challenge for this fighter brand was the mismatch between price and features, as the latter could justify a higher price, whereas a fighter brand should be cheaper to produce. After two quarters with low margins, the price increased starting in Q15 from the lowest 26,400 to 31,280 in Q18, which increased the margins without affecting sales. Thus, management obtained a key learning about pricing for the value of a product and subsequently reduced prices of other products to reach equilibrium-price (Industry Masters 2023).

IXOR's high prices were not justified by readiness in the market as investments in

infrastructure and features were finalized by the end of Year 4. Demand increased annually after completing investments and prices were revised to mirror the differentiation strategy. Ultimately, IXOR obtained a WACC of 6.5% which shows the ability to obtain cash at a favorable cost to finance growth. Employee satisfaction remained relatively high throughout and ended at 99.9%, creating stability in HR.

Function 2: Innovation

Innovation strategy

Innovation is a cornerstone for organizational transformation. Therefore, it was guided by a strategy to create value for customers through high quality products, electrification and focus on reduced emission (Pisano 2015). This entailed preparing the organization to become fully electric by Y3 and offering a range of products to boost sales across segments. Another key area was management of product lifecycle aimed to introduce new models as old vehicles entered decline. As the industry had already begun transitioning, IXOR's innovation strategy was architectural as the company needed to build new core competencies to cope with new technologies (Christensen 1997). New products set out to be guided by data from marketing (sales volume, price) and operations (Inventories, contribution margin) as well as consumer preferences. An assumption made was the possibility for preferences to change, and ability to create demand with a technology push i.e., for hybrid (Major 2023; Munoz 2022).

Simulation Innovation Challenges: A Cross Road

Solid state battery technology was preferred as storage capacity, safety, lifetime, and environmental impact of this technology had the best outcome. Bowman and Dr. Proff (2023) suggests that customers purchase decision for EV is driven by: cost, driving range, time to charge, public charging infrastructure and safety. This technology is costly; however, the

trade-off would justify a differentiation leadership strategy with higher quality. The adaption of solid-state batteries was crucial as it was expected to reduce prices (Crabtree 2019). Kage et al. (2016) identify digitalization as an obstacle for manufacturing industries, where smart products lead to new areas of competition. Finding partners to establish value network is difficult due to lack of information and risks of competition in other areas. Thus, acquiring a company to facilitate growth and sustain competitive advantage as it would create high value.

Executing innovation: Why are we not selling?

Replacing existing technology so quickly proved risky due to slow adaptation. Roger's diffusion of innovation theory suggests that people fall into five categories (innovators, early adapters, early majority, late majority and laggards) when changing behavior or consumption pattern. Decisions to adopt new technology is influenced by the relative advantage, compatibility, complexity, trialability and observability of the product (LaMorte 2022). 4x4H and Lux H suffered low margins, high inventories and caused difficulties in production. Due to lack of insight into customer preferences for hybrid, its future was uncertain as IXOR's strategy was to eliminate fleet emission and hybrid only reduced it. The low adaptation reveals a lack of relative advantage as compatibility and observability were not obvious for consumers. Consequently, management justify abandoning hybrid as EV became available, to focus all resources on the development of EV. This contrast the global trends, as hybrid technology has a higher preference than EV in all markets except China (Bowman and Dr. Proff 2023). Furthermore, the demand for SUV's especially in Europe is a well-documented trend, thus, the failed 4x4H was a surprise (Munoz 2022). Demand for EV increased over time according to market-pull where CO2 penalties for ICE as well as bonuses for EV helped stimulate demand. Furthermore, most people charge at home, while in dense urban areas obstacles to home charging and ease of using public stations is a key challenge (Bowman and

Dr. Proff 2023; Hensley et al. 2022). IXOR's own investment in electrification, connectivity and autonomous driving pushed technology to the market, which was crucial as range anxiety and charging network was an issue.

Arguably, the company was conservative during the initial investment phase and could have pushed EV quicker if infrastructure for charging and features had been completed sooner as High Power Charging (HPC) was only available in Q14. When comparing this to the real world, the key driver for EV adaption is customers perception that EV will decrease their costs (Bowman and Dr. Proff 2023). This explains why it took time for EV to show relative advantage and compatibility with customers compared to ICE (LaMorte 2022). Thus, IXOR's slow recognition of vacant roles in the value network slowed demand (Christensen 1997; Kage et al. 2016). Consequently, its weakest innovation link was to expand infrastructure, improve connectivity and autonomous driving, ending up in an "idea diffusion" with slow adaption (Hansen and Birkinshaw 2007). There is a parallel between IXOR completing these investments and reaching a 92% score for e-mobility project in Q19 and increased sales.

Development of new products followed a product life cycle principle, where new products were initially launched once the current model entered decline. However, no critical evaluation of the vehicle's performance took place before replacing the old model. Arguably, understanding and critically evaluating customer preferences better based on marketing data, IXOR could tailor products to customers' needs earlier (Christensen et al. 2016).

Function 3: Operations

IXOR's operational strategy and performance

Overall, the volume produced was low to medium due to the differentiation strategy. The

product strategy for luxury cars was low volume, while Compact and City Sprinter (introduced Q12) produced at larger scale (2-3 factories). Consequently, number of factories from Q7 to Q24 was four in Europe, three in China and two in America. In Q24 production in China expanded by one factory to cope with growing demand. Furthermore, the portfolio variety was medium, selling up to seven products and a minimum of five across ICE, Hybrid and EV. Figure 3 show that production volume is unstable, due to challenges managing portfolio variety (Shih 2020). Variation in demand has been low in the automotive market, while new technologies experience low demand in the early stages before it becomes mainstream. As EV picks up demand, ICE is expected to slow down. Moreover, due to diverse mobility trends the overall demand is also expected to decline slightly although it should not be subject to seasonal variation. Thus, variation in demand is relatively stable while minimum production was 15 000 vehicles. For i.e., hybrid, this was larger than demand until year 6. Production visibility is low as customers are not exposed to it (Slack, Brandon-Jones, and Johnston 2013).

Operational performance

<i>Objective</i>	<i>performance</i>
<i>Quality</i> ★★★	Quality is a key metric for IXOR, which produce luxury vehicles at specification with up-to-date features (highest among competition). It is also impacted by suppliers as they are largely in charge of product design and development (Özatağan 2011), thus investments in supplier partnerships to ensure quality.
<i>Speed</i> ★☆☆	Speed of production was high for luxury vehicles until Q20, while delivery was slow for this segment due to the lag in demand (high inventory). The smaller cars had short inventory and speedy delivery, while expanding production was slow.
<i>Dependability</i> ★☆☆	Discrepancy between production and demand resulted in low dependability for staff and factory utilization, as products moved or halted. High inventories led to high dependability for luxury vehicles and low dependability for small cars which experienced DOI of 30 as customers had to wait.
<i>Flexibility</i> ★☆☆	IXOR had medium product flexibility as operations swiftly change models and production country. The backside of this is low volume flexibility, as volume outweighed demand until EV adaptation increased. After Q20, demand grew, and factories expanded to increase operational flexibility.
<i>Costs</i> ★★★	Production instability caused high inventories and low factory utilization which increased costs. Complexity costs increased when introducing new technologies, however, declined/stabilized when location remained untouched and produced

	according to demand. Economies of scale were reached for Compact and City Sprinter which produced up to 45 000 vehicles per quarter with lower inventories, and features as it was designed to be more affordable. Costs were also affected by production country and tariffs. Operations aimed to schedule production country according to demand, however, demand restraints prevented scaling before Q24. The EBIT margin fluctuated over the simulation ending up at 33.5% in Q28 (8,4 billion EBIT in 2026) after experiencing growth over the last quarters as production became more predictable.
<i>Sustainability</i> ★★★☆☆	Sustainability investments were prioritized to lower emissions across activities. The first investments (water consumption reduction, sustainable suppliers, and energy efficiency) were made in Q5, covering Scope 1, 2 and 3. By Q19 the ISO certificate was implemented. These scopes were also affected by production volume (App 2, Figure 1-3), where the increase in emissions across all scopes in Q17 compared to Q16 and Q18 can be explained by a relative low production in Q16 and Q18, while Q17 had a sudden spike in production. Costs are influenced by sustainable investments as waste and energy efficiency decrease productions costs. Earlier investments in CO2 offsets could have reduced emissions in scope 3 and reduced CO2 penalties. Ultimately IXOR's sustainability rating was 74%.

Table 1: Operational performance objectives

Operational obstacles

IXOR's challenge securing its position as a luxury brand until Q20 include difficulties predicting demand and variety in products preventing economies of scale, which lead to overproduction and high unit costs. Chan et al. (2017) identify overproduction and underproduction among the greatest production challenges. Overproduction leads to low utilization of resources and tied up cash while underproduction means products are not available at short notice and can affect demand. Biz and Air models demand was slightly higher than production in one factory, and the production was often adjusted up or down which led to high spikes in DOI and instability in production (Figure 1 & 2). This was a challenge, as the volume balanced between overproduction and underproduction. Figure 3 shows total inventories available from last quarter compared to sales and production, demonstrating high inventories and production instability. This is mirrored in overproduction of Lux and 4x4 which led to customers purchasing older vehicles (Figure 4). Thus, vehicles were moved across factories or halted production for periods which increased costs and slowed cash flow.

After Q20 operations stabilized with increase in demand, which is in line with Hensley et al. (2022) prediction that demand will sixfold for EV by 2030. High factory utilization, growing demand and expansion contributed to reduced production costs and higher margins as improved efficiency and collaboration in the supply chain lead to greater flexibility and cost saving (Ramirez-Peña et al. 2020; Armengaud et al. 2017). A current challenge is the trade-off between variety and flexibility, as six vehicles are produced; three have 30 DOI, and two over 100 DOI. High variety in products make forecasting difficult although it is important to stabilize production to obtain higher margins and lean production (Shih 2020).

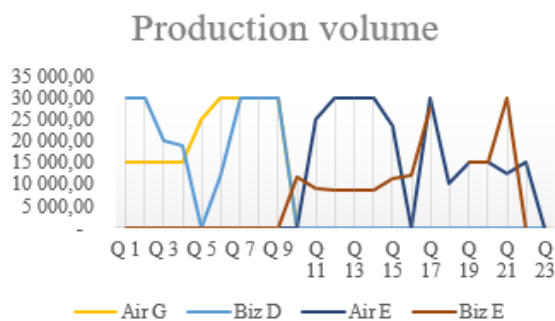


Figure 1: Production fluctuation Biz & Air

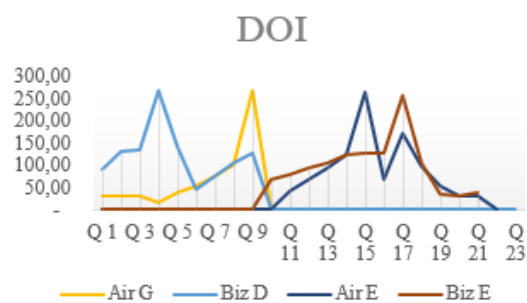


Figure 2: DOI Spikes Biz & Air

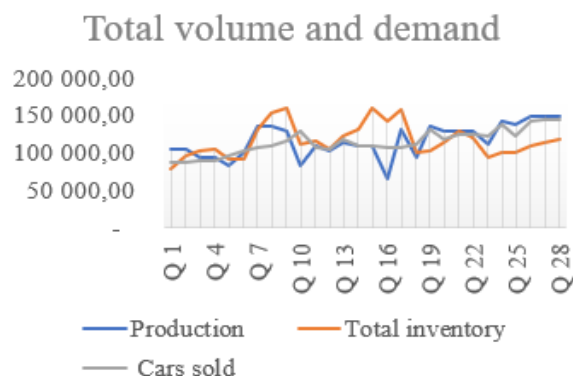


Figure 3: Total sales compared to inventory and production

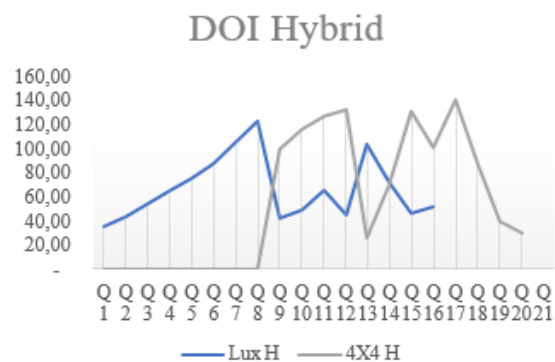


Figure 4: Fluctuating DOI for hybrid

Current state: IXOR's position after 7 years

PESTEL trends such as tariffs between countries reaching 20%, CO2 penalties, EV incentives and technological advancements affected the industry. IXOR was a fast follower, introducing EV's as soon as they became available and invested in new features. Compared to competition, IXOR is a clear quality leader with up to level 4 for connectivity and autonomous

driving, while one competitor reaches level 3 for both. This justifies higher prices. The company performed well of KPI's such as WACC, employee satisfaction and e-mobility project throughout. KPI's related to operations suffered until IXOR managed to control the cost side and ended up with a satisfactory EBIT margin in Q28.

Judging the performance from product development to production, price, body style and fuel milage are the order qualifiers (Costa 2023). IXOR seem to have initially overestimated customers' willingness to pay and had a slow reaction in production to manage inventories. Investments in solid-state batteries and infrastructure made IXOR able to reduce prices according to customer preferences, while offering a variety of vehicles with long range. Cracking the pricing code increased sales and lowered DOI for 4x4, Air, Biz and Lux after Q20 indicate that IXOR's products were meeting customers' expectations. An interesting outcome is the switch where this group of vehicles picked up more sales, while the compact vehicle lost some of its desirability towards the end. This was possibly due to a mismatch in product and preferences. Safety and warranty are the order winners, where IXOR invested in the available features to ensure high quality products, although this is not measurable.

IXOR's performance compared to Tesla INC and MG Motors

MG Motors (MG), a value-for-money brand, is experiencing huge growth in the transition from ICE to EV. The company has a similar product portfolio as IXOR including sports cars, SUV's and more affordable models (Jiang and Cheetham 2021). Moreover, the companies share core pillars such as customer focus, quality, and technology innovation. MG's strategy is to offer high quality at an affordable price which correlates with IXOR long-term strategy of "giving back to people" through making EV's available by having affordable models in its portfolio (Qin 2021). From 2020 and forecasted to 2027, MG's fleet will have between 2-8% hybrid, EV is expected to reach 24% by 2027 while the remaining portfolio is ICE. This

corresponds with the global market, as the electrification is slower than simulated by IXOR. Tesla on the other hand aim to mass produce EV's, but started out with a small portfolio targeting higher paying segments (Stringham, Miller, and Clark 2015). They are a global leader in EV sales; however, demand is underperforming compared to production due to large expansions. Consequently, they have cut prices to incentivize buyers and compete with an increasing numbers of competitors on the EV market (Carson 2023). Here a parallel to IXOR's production can be drawn, as overproduction caused huge inventories and forced prices down.

Overcoming network externalities such as 1) merging hardware and software, 2) charging, and 3) dealership, distribution and service network's has been key for Tesla to create demand through a technology push (Stringham, Miller, and Clark 2015). The business model aim to create cars with low maintenance, sell directly to customers online or through few shops (Bleakley 2023). This is new for the industry, as traditional dealerships sell vehicles at low margins and rely on selling expensive repairs. This is another parallel to IXOR, as the network externalities around EV needed to be built from scratch to create demand. The timing and speed of these investments complemented by changing legal requirements impacted the transition to EV. In reality, few companies have transitioned away from ICE.

Tesla is currently the highest valued car manufacturer with a market capitalization of 569,95 billion dollars (Statista 2023; Yahoo 2023). Moreover, forecasted sales for 2023 are expected to reach 435 570 vehicles and a revenue of 26,43 billion. In 2026 the revenues are expected to reach 29 billion with 487 870 global sales. This show Tesla's scale, however, its first net income came in 2020 after years of heavy investments and cutting losses (Carlier 2023). MG's forecasted revenues in 2023 reached 3,7 billion with 245 310 vehicles sold. The number of vehicles sold are forecasted to be 271 120 by 2026 with the market cap reaching 3,8 billion

(Statista Market Insights 2023). A competitive advantage for MG is its 7 years warranty for all vehicles which is securing customers a hassle free product and is an order winner (Costa 2023). IXOR sold 443 500 vehicles in 2023 with 20 billion in revenues, proving relatively similar sales patterns to Tesla. The simulated results from 2026 show IXOR's revenue at 27 billion with annual sales at 555 560 vehicles. IXOR's transition to EV has similarities to MG's transition, where its core competencies must change quickly, develop sustainable values and product quality. Although IXOR's strategy was to be a fast follower, its sales pattern shows similarities to Tesla which is likely due to the rapid speed of transition. MG is changing its portfolio slowly as it must adapt and build new competencies. IXOR's quick transition would arguably be risky, thus looking at MG's change is reasonable to understand traditional car makers' strategic shift. Disrupting an entire industry demands huge investments and will likely not be profitable in the short term. Arguably, IXOR fell slightly short in its transition as it was risk averse and thus a slow mover compared to other simulated companies.

Discussion

Management struggled to exchange information, meaning the company did not sufficiently develop dynamic capabilities to create an agile organization through the electrification process (Hansen and Birkinshaw 2007). A clear separation between operations, innovation and marketing functions prevented clear forecasting and development of infrastructure to support the overall technology shift. If the company had greater flexibility in its pricing at an earlier stage, operations could rid itself of inventory and lower the unit cost of production. This goes hand in hand with infrastructure and market readiness for EV, as the industry was in a growth stage (Johnson et al. 2017). Lack of communication, training and forecasting between sales and production are key drivers for these issues (Chan et al. 2017), as production decisions were not based on sales forecasts. IXOR's failure to create dynamic capabilities to better

integrate marketing and operation efforts resulted in an inventory crisis where both overproduction and underproduction took place (Easterby-Smith, Lyles, and Peteraf 2009). Ramirez-Peña et al. (2020) found that management and organization are the biggest obstacles for automotive companies transitioning into a sustainable supply chain and production model. Reasons are lack of knowledge of benefits and returns, as well as fear of management changes. This highlights the necessity of sustainability training and knowledge sharing to ensure successful adaptation and implementation of such practices. Therefore, HR investments were crucial to transition although general management hesitated due to uncertainty of outcome.

Comparing the simulation to reality, the electric shift happened rapidly for IXOR. Building charging infrastructure, creating mass demand and adaptation almost from scratch is likely to take more than six years. Moreover, IXOR's strong focus on eliminating emissions by completely abandoning ICE before gaining enough traction with EV was risky and clearly had a trade-off between emissions and profits which weakened the financial position. This decision was taken to improve sustainability rating and gain competitive advantage on EV although it resulted in low profits and slowed down investments until Q20. Perhaps rethinking the business model at an earlier stage and pivoting into a value-for-money or cost leader model could facilitate economies of scale and favor the results. As the Death Valley with low revenues and low margins interfered with future investments, the challenge to overcome it became larger. As the company had to obtain new debt to repay old loans, its operational cash was threatened and investments into sustainability and innovation had to slow down. This cycle was hard to break, as investments were needed to create demand and reduce costs.

Setting the stage for both critical incidents:

The situations chosen for reflection were typical occurrences as the team over the course of

working together displayed all five signs of dysfunction within a group such as: Absence of trust, fear of conflict, lack of commitment, avoidance of accountability and inattention to results (Lencioni 2002). These dysfunctions combined with a dominant character, led to situations and feelings which I am not used to in group settings. Both incidents analyzed represent behaviors which I would like to be aware of and change. Therefore, I need an action plan for similar instances in the future. For context, before we started working together, I shared the traits I display at my worst with the group: Closing up, being chaotic, disregard for other's feelings, agitation and resistance. These became evident in both situations. The traits at my best are openness, compassion, ability to think critically, patience and being engaged.

To analyze both incidents Gibbs reflective cycle will be used (The University of Edinburgh 2020). The model breaks down an event into six stages to reflect and learn from them. The



Figure 5: Gibbs reflective Cycle

first three steps concern the details, while the latter three will make sense of why it happened and prepare you for similar situations in the future. Step 1. Description, to get the full picture of the event, people involved and happenings. Step 2. Feelings are concerned about your feelings and thoughts throughout the situation. Step 3. Evaluation judges what went well, and what did not. Step 4. Analysis, this is where we extract meaning from the situation using knowledge and literature. Step 5. Conclusion is for learnings, while step 6. Action plan provides a structure to deal with similar situations. The last two steps will be combined.

Description Critical Incident 1: When Working Styles Collide

The first critical incident occurred around the first roleplay, the sales pitch, although it had built up for a while. We had a task where only three team members could participate, and the

stakes were an advantage in the simulation. Nobody wished to pitch, so I volunteered so we could move forward with the support of two other teammates. Afterwards, we discussed for hours without producing a tangible result as our ideas differed and some had very strong opinions. As a team, we often got stuck in the details, rather than the overall message. One person shot down other's ideas almost immediately, while strongly holding on to their own ideas and getting somewhat aggressive when others disagree. As a "red" person, I tried to ask these questions to get clarity of the overall message we should bring across. My attempt to get the overall picture was shot down, as the majority preferred to create the script word by word. For me, this was frustrating as even though we had discussed our core values, strategy, and vision at length our team struggled to reach conclusions. Consequently, I was not clear on the priority of our message and felt that I was not fully trusted. I suggested that the member who had very strong opinions and signaled lack of trust could take over the pitch without luck.

I recommended splitting tasks so that only me and the others who would be present could prepare, as the others kept distracting us with chitchat and arguing over small details. They agreed, so after already spending hours on a script we could finally start to shape it. My goal splitting the tasks was that we could create a vision for the pitch, and make sure we hit all the important points in a natural way. My preferred style was more laid back, while it was clear that we all had different approaches in mind. I did not manage to share my vision with the others, so we ended up continuing with the same work style which gave me the impression that we were not aligned as a team, and we struggled finalizing content.

Feelings

This situation frustrated me, because I had a triggering feeling that the absence of trust from some team members resulted in lack of commitment from others including myself. This

usually made me feel like I was not accountable for the decisions we made, and thus a lower regard for the outcome. Now I was directly accountable for the outcome and did not feel trusted, which made me wish I had not volunteered for it. The feeling of trust being absent was uncomfortable. As my personality lean towards “Fiery Red”, this process felt like a waste of productive time because we lost time discussing minor elements regarding rather than the objective. My frustration grew into lack of patience and negative feelings towards team members as I felt like I lost control over my task, which is a trigger point for a red personality (Insights Discovery n.d.). Although we did not work effectively together and struggled to trust, I believe my team wanted to support me and did so in the way they thought I needed.

Evaluation

This was a typical incident where we struggled with time management and decision making which made us a low performing team, as the task at hand was drowned by behavioral noise (Dr. Benton 2005). I had strong preferences for doing this in a different way, which would have made me more comfortable, but I can be shy of conflict and doubt my own approach in satiations without an absolute solution. Thus, I did not show them my preferred way of working. In this situation I failed to understand and communicate my needs in a team environment where I took the lead. My lack of confidence directly affected the outcome of the task at hand, which serves as an example of how dysfunctions within our team decreased our ability to perform. On a positive note, the two team members who attended the pitch with me showed commitment by spending much time on the script, and we secured half the reward.

Analysis

My behavior showed that I faced an environment fostering some of my worst behaviors, such as agitation and resistance to collaboration. I initially demonstrated low internal- and external

self-awareness which according to Eurich (2018) model for self-awareness falls into the category of “seekers” (App. 2, Figure 4). This is when someone does not know what they stand for, or who they are, causing frustration with a project or relationship with others. I had not yet assumed a role in the group and was seeking my place, which demonstrates lack of awareness. Her study found that leaders who see themselves from another’s point of view tend to build stronger relationships with their team. Internal self-awareness represents how one sees one’s own values, feelings, qualities etc. A turning point was when I volunteered to pitch with half the team. I knew I could do it and take an active role. Consequently, my internal self-awareness changed to “Introspect” as I was aware of who I was in the group although I did not challenge it or try to view it from others perspective. Furthermore, as I was too focused on “why” I was feeling frustrated instead of “What” made me feel it, which resulted in a negative spiral where I was frustrated with the lack of commitment and trust. I should have asked myself “What is causing this” to get to the root of the problem.

Haas and Mortensen (2016) describe the importance of a shared mindset to overcome critical challenges like “Us vs. Them” and incomplete information. Although we had a common strategy, we missed a shared mindset which resulted in “us vs them” thinking. Lack of trust within the team prevented discussions from being a “safe space”, and therefore I struggled to speak my mind freely (West 2012). This exemplifies how the team dysfunctions build on each other and ultimately created a low performing team (Lencioni 2002). Moreover, according to Birkman, my score for “Self-Consciousness” which relates to sensitivity in communication, my needs are frank and open communication, while shyness and evasiveness causes stress (App. 2, Figure 6). It was a misalignment between my needs, and what they thought I needed.

Conclusion and Action plan

The situation and group dynamics extracted behaviors of resistance in me, which negatively affected the group. This came from failure to show external self-awareness to see myself from others' point of view, as well as neglecting what made me behave the way I did.

To avoid destructive behavior in the future, I need to consider my internal self-awareness and external self-awareness to understand if I come across to others as I intend to. This begins with diagnosing the problem when feelings of closing up, agitation, resistance and disregard for other's feelings emerge by asking "what is making me react/ feel the way I do?". Then I need to assess if my action aligns with my intentions, by asking myself "what makes my peers react the way they do?". To fully understand this, it is necessary to ask my peers for genuine feedback, practice active listening and open questions to understand them better. It is also of importance for me to inform my peers what I need from them.

Description Incident 2: Dealing with conflict

The second incident emerged on the first day of the simulation, and continued until we had the team clinics session. This was a dynamic between me and the person I shared my role with. It started out with a discussion where I questioned their thinking and had another idea in mind. After discussing at length, I asked others for input and for a vote, but his voice got louder to the point of almost screaming and they said, "*it is not fair to just do it like that*". Consequently, the rest of the team stayed silent, so when I still did not agree with him, he shook his head, expressing loud hissing and discontent saying things like "*bullshit*", "*you cannot mean that*" as I disagreed. I found this behavior extremely provocative and needed space. Thus, my reaction was to close off and avoid discussing with him instead of speaking my mind. My disengagement at this stage only enhanced his behavior as he began micromanaging me, constantly telling me what to do, and asking "*what are you doing?*" when

I was taking time to think. Right after, he proceeded to tell me “*I got irritated by the way you took your notes*”. At this point, I had enough and asked him to give me some space to let me think before we could discuss. I could not hide my agitation, so my tone was somewhat harsh. They gave me space, and I managed to calm down for the time being. However, this pattern continued in the coming days and did not only affect me as this behavior was directed at others who disagreed with them. We continued to have a few incidents where we would disagree, where they expressed loud disapproval. The last instance was when over half the group did not agree, they demanded the person that fronted the discussion to take accountability. This dominant group member dictated decisions as the team went along to avoid conflict.

Feelings

This behavior was triggering, made me frustrated and withdrawn from the decision making. I do not recall the exact discussion, however, I felt that their aggressive need to be right and for others to agree made it difficult to respect this person. This is in line with my results for the Birkman personality test for “Assertiveness” which relates to my tendency to speak up and express opinions freely (App. 2, Figure 8). My score clearly shows that a cause of stress is overly assertive or aggressive behavior from others, which can lead to difficulties speaking up or becoming overly argumentative. In this situation, my stress reaction was first to becoming argumentative over my own point until I realized it did not matter. Then I stopped communicating and became uninterested in the outcome rather than finding a productive approach. I felt like they anointed themselves as a team leader, it did not emerge based on merit. Which was a further cause of negative associations for me, as I struggle to respect leaders I view as incompetent. Thus, I tried to remain polite, but my blunt comments would slip out occasionally over the remaining of the meeting as I felt micromanaged. All these negative associations and feelings lead to difficulties in communicating and collaborating with them,

which in turn only enhanced their behavior. Although I was aware of this, it was difficult to alter my behavior at this point. When they gave me space, I felt more at ease and started engaging again although not to the same extent as I wished to avoid some lengthy discussions.

Evaluation

After the meeting, the group gave me feedback to speak up more. This was very frustrating as I did not know how to get my opinion across as it was often shot down before we could discuss all options as a group. At this stage I was very much aware of my feelings, however not able to act to improve the situation. Thus, my avoidance of accountability in uncertain situations compromised my ability to speak up (Dr. Benton 2005). It became evident that we did not manage to use our differences to our advantage at this point (Toegel and Barsoux 2016).

Analysis

My feelings might have been biased, as I have experienced similar situations throughout the masters, where the loudest person in the group refused to acknowledge alternative solutions. Thus, I failed to recognize the signs and plan on how to deal with these types of issues in a timely manner before it became a problem. Which lead to an “me vs. you thinking”, which Haas and Mortensen (2016) list as one of modern teams challenges. These authors also portray the struggle of incomplete information, which became evident in our team as information was spread across the functions, and we could not sufficiently forecast future events. I felt that the incomplete information contributed to different views within our team, and we often failed to get all the information out in the open. Moreover, the decision making was influenced by one team member having more “airtime” without any correlation to expertise. This again resulted in a diffusion of responsibility, as the people responsible for an area could often be overpowered by this individual (West 2012). After a few rounds, this became a spiral where

more team members would avoid discussion, and this person felt the need to fill the void. I struggled to accept the decisions made under these circumstances as the quality of the decisions was not always evident to me. We did not properly analyze results which made most decisions a gut feeling or educated guess based on the strategy. I found myself in opposition to the most influential person in the group, but without sufficient evidence to confidently argue my point of view. Thus, I often avoided pushing my ideas and went along with decisions.

Another symptom of “Me vs. You” thinking was that discussions between me and my partner became negotiations. The dual concern model (App. 2, Figure 8) explains negotiation styles based on regard for interpersonal relationship and substantial outcome (Lewicki, Barry, and Saunders 2016). According to this model, a person with low regard for the relationship and high regard for the outcome follows a “competition” strategy. I felt that my partner was competitive, while my preferred style was “collaboration” with high regard for relationship and outcome in the beginning as my goal was to understand the impact of all options. When I felt that they were unable to listen, I subsequently changed my behavior into competing, which can be characterized with frequent “agree to disagree” (Insights Discovery n.d.). It is also a “Fiery Red” trait to be competitive. When our discussion hit a wall, I entered the stage “Avoidance” as I lost concern for both outcome and relationship (Lewicki, Barry, and Saunders 2016). This again show how the initial lack of trust escalated through all the five dysfunctions of a team before I ultimately became inattentive to results (Lencioni 2002).

Furthermore, as I was aware and unable to change my behavior I fell into what (Brassey, De Smet, and Kruyt 2023) refer to in their Dual Awareness model as “perceptive” (App. 2, Figure 5). This model analyses awareness level of internal and external environment on one scale, and ability to act on the other. In this stage I recognized that my behavior resembled what I suggested would be my worst behavior a couple of days earlier. However, I could not respond

effectively. This stage represents mid-level awareness, and low ability to respond.

Conclusion and Action Plan

These conflicts worked against us as we failed to overcome our differences to reach productive team solutions (Toegel and Barsoux 2016). I contributed to this, as my frustration lead me to express competitive behavior and an “I lose, you lose” attitude (Lewicki, Barry, and Saunders 2016). Besides, reaching a higher level of awareness and ability to act would lead to effective ways of handling disagreements. To deal with such situations, I must learn to understand my reactions, how it affects others around me and manage an adaptive approach. To become adaptive to dealing with situations that cause me to stress or react negatively towards others, I must be aware of the reactions I display at my worst. Then recognize what makes me feel it and take time to collect myself before responding. By doing so, I will reach awareness level 4 “Resilient”. When I successfully manage to withdraw to reflect before reacting, I will gain control over my response and avoid behavior that causes stress to my colleagues. Lastly, to reach dual awareness in action, I must be “adaptive” which is to create learnings in the moment, rather than becoming protective over own feelings (Brassey, De Smet, and Kruyt 2023). To reach this stage, I must reflect in the moment and avoid taking matters personally.

Concluding the reflection

After reflecting upon the groupwork and my own role in the dynamics, it is evident that my reactions to my teammate affected him negatively. I am responsible for losing my sense of accountability, becoming competitive and failing to act on a pattern within myself. It takes two to collaborate. These few weeks showed me that even though I tend to believe that I understand why I react in a certain way, this is not obvious to others. Throughout the remaining of the simulation, I managed to collect myself and control my response. The team

gave me positive feedback (App 2, Figure 9), saying I should speak up more, and that I had a calm presence. I did not always recognize this, as my feelings were chaotic. I often ended up compromising although I tried to ask for input from everyone. This included encouraging less dominant team members to speak while I picked my battles carefully.

In sales roleplay when I was uncomfortable taking the lead, I displayed a lack of accountability and commitment which was a result of being insecure about my colleagues. I struggled with this due to a desire to keep harmony and lack of evidence of right or wrong in the simulation. The consequences were small, however, in a real-life event this behavior can cause great damage to a business or relationship. It became evident that I must be comfortable taking the lead, executing my ideas clearly and be open to alternative approaches. I must learn to collaborate with people with triggering behavior by being aware of how it affects me, and how I can turn it into a productive relationship by having an adaptive approach.

My key learning from BiP is to be strategic when dealing with conflicts and to be confident speaking my mind. To come across as a reliable source I must be aware of my goal, make sure I come across as intended, and understand how I affect others. This includes tactics as described to reach dual awareness in action, which is high internal and external self-awareness as well as asking peers for feedback (Toegel and Barsoux 2016; Eurich 2018).

Limitations

One should keep in mind that these results are simulated and might not follow the same principles as in real life. Moreover, as the analysis of each function has limited space, some elements have intentionally been left out due to page and time limitations as well as only analyzing three functions in depth. Regarding the reflection elements, these incidents are analyzed in a vacuum possibly ignoring broader factors at play.

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Appendices

Appendix 1: Tables

Table 1: Porters Five Forces

<i>Forces</i>	<i>Automotive industry</i>
<i>Threat of new entry</i>	- Technology and market development of EV is developing quickly. - Government legislation favors EV through future ban on ICE, CO2 penalties and bonuses for EV. - Product differentiation through developing new technology (batteries with better range, software, cost efficiency). Traditional automakers do not have the resources and capabilities needed to create the EV's of tomorrow, thus, software/ tech companies are entering the market. - Capital requirements are high for both new entrants and for traditional automakers, as they need to develop new capabilities. - Expected retaliation through price cutting is still a low threat as companies are still in a development phase. Threat of new Entry has been low since WW2, however, this is changing (Porter 1979). Now, the threat is high for the automotive market.
<i>Threat of substitutes</i>	- Trends improving price-performance such as shared mobility in cities are a threat to private ownership. - Products by industries earning high profits such as tech companies introducing vehicles with high levels of automation and new EV technology is a threat to the traditional ICE and current automakers. This is not a threat to the survival of the industry, only for ICE technology. This threat is still relatively low for the industry.
<i>Power of buyers</i>	- The concentration of buyers is changing as customers are largely informing themselves online (i.e., Tesla's direct B2C distribution model). Traditional buyers are the OEM's. - Buyer competition threat: automakers cause a threat of forward integration to the buyers. - OEM's buy in bulk, and the business model is changing as EV requires less maintenance. Traditionally, buyer's profits were low (on sales, money was made on service and parts) which means buyer will aim to reduce costs. - The quality of products or services can save the buyer money, and high-quality vehicles with low maintenance can defend a higher price. The power of buyers is still relatively low.
<i>Power of suppliers</i>	- Unique products/ differentiation is low for ICE as production of parts is largely outsourced to Original Equipment Manufacturers (OEM). This is changing for EV, where raw materials for battery technology are scarce and suppliers must develop new resources and capabilities/ suppliers are changing. - Battery suppliers are limited. - Switching costs are high especially for battery technology, as changing technology requires new skills. - Car manufacturers try to insource production to a larger degree to build up capabilities for EV to create a competitive advantage. This threat has been low for ICE, while it is growing rapidly for EV.

Competitive rivalry

- Three direct competitors in the simulation, where one has EV. The rest is expected to go through a similar change.
- Number of competitors and equal power: Traditionally, only a few players on the market with high power. Now new entrants (tech companies) are changing the industry.
- The industry is growing quickly in terms of EV, while ICE is declining.
- Capacity adaptation in large increments as expansion is timely and expanding a factory (in the simulation result in + 15 000 quarterly vehicles produced).
- The industry has high fixed costs and high exit barriers.

The competitive rivalry is high for the automotive industry.

(Johnson et al. 2017; Dau et al. 2020; Heineke and Moller 2023; Hensley et al. 2022; *The Economist* 2022; Armengaud et al. 2017).

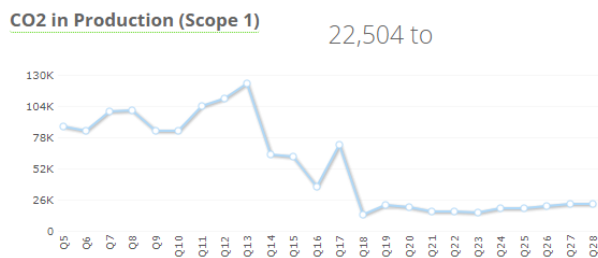
Table 2: SWOT analysis

Strengths	Weaknesses
- Vehicle lines that are popular and are selling well (<60 days of inventory) - Initial stages of investment in electric vehicles are expected to bring revenue growth in short term. - Excellent employee relations leading to good productivity achievements	- The product portfolio consists exclusively of convertible vehicles - Three vehicles with >60 days of inventory need management attention in operations and marketing. - A restructuring of the business short term may be required.
Opportunities	Threats
- Electromobility is the future. E-Drive modules can be used in 3 quarters - Green investments that can be financed with green bonds are available - New product offerings with up-to-date technology. - Expansion of factories are possible - The stock market appears receptive to a share issuance - The market responds well to marketing spend	- Older model lines are a drain on resources - Expensive debt due to credit rating and access to new borrowings - Continuing aggressive government regulations that threaten profitability - Volatility in the cost of raw materials.

(Industry Masters 2023).

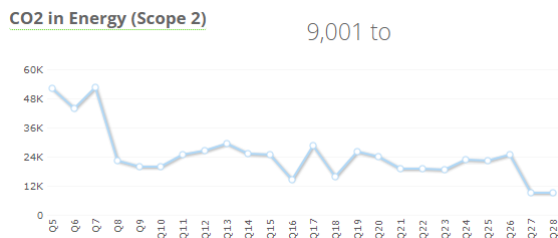
Appendix 2: Figures

Figure 1: CO2 in Production (Scope 1)



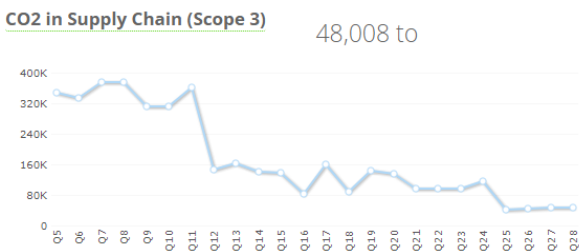
(Industry Masters 2023)

Figure 2: CO2 in Energy (Scope 2)



(Industry Masters 2023)

Figure 3: CO2 in Supply Chain (Scope 3)



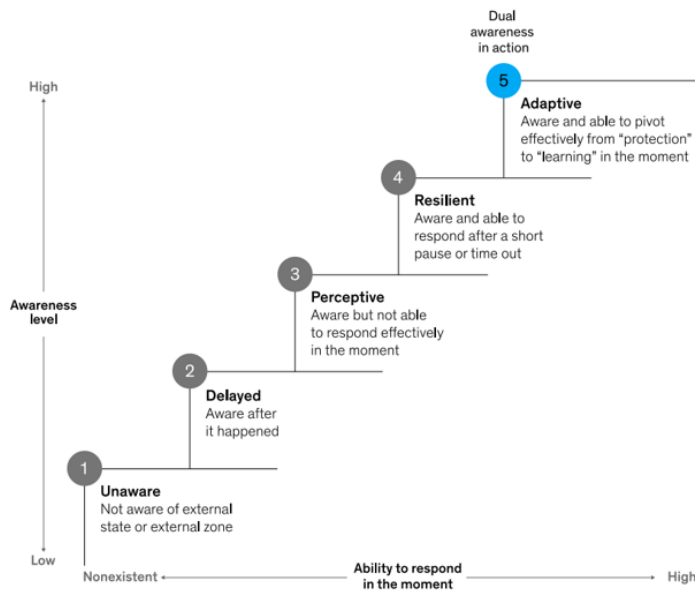
(Industry Masters 2023)

Figure 4: Self-awareness: internal vs. external



(Eurich 2018).

Figure 5: Dual awareness with deliberate calm (self-awareness model)



(Brassey, De Smet, and Kruyt 2023).

Figure 6: Birkman personality test: Self-Consciousness

USUAL, NEEDS & STRESS



SELF-CONSCIOUSNESS

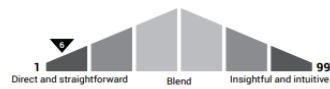
Your use of sensitivity when communicating with others

Your natural tendency is to be direct and straightforward in your personal relationships. Objectivity and frankness are among the considerable assets resulting from your ability to minimize self-conscious feelings.

Usual Behavior:

- unevasive
- matter-of-fact
- frank and open

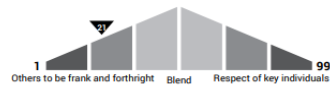
Usual Behavior



Needs:

In the same way, you are most comfortable when others are frank and direct toward you. When being praised, you need to feel that the compliment is genuine and free of sentiment.

Needs



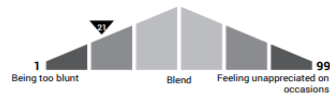
Causes of Stress:

In the presence of shyness or evasiveness you are likely to feel uncomfortable. You do not respond well to subtlety from others, making it sometimes difficult for you to recognize their personal needs and feelings.

Stress Behavior

Possible Stress Reactions When Needs Are Not Met:

- reduced concern for others
- detachment
- tactless statements



(Birkman 2019).

Figure 7: Birkman personality test: Assertiveness

USUAL, NEEDS & STRESS



ASSERTIVENESS

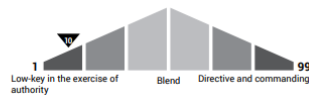
Your tendency to speak up and express opinions openly and forcefully

You have indicated that you have the feelings and attitudes of those who prefer to be free of close authority. This suggests that you are most effective when there is a minimum of controls placed upon you, which helps keep relationships pleasant.

Usual Behavior:

- deferent and agreeable
- pleasant
- low-key

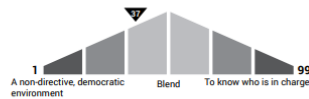
Usual Behavior



Needs:

However, you clearly recognize the importance of control and authority in your environment. This implies a need for some balance. You are most at ease in surroundings that maintain direction and control in a fair and equitable way.

Needs



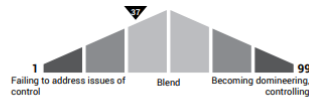
Causes of Stress:

Because of your need for balance, you may find yourself annoyed by others who are too assertive, or becoming unusually aggressive in situations that seem to lack direction.

Possible Stress Reactions When Needs Are Not Met:

- becoming argumentative
- difficulty speaking up

Stress Behavior

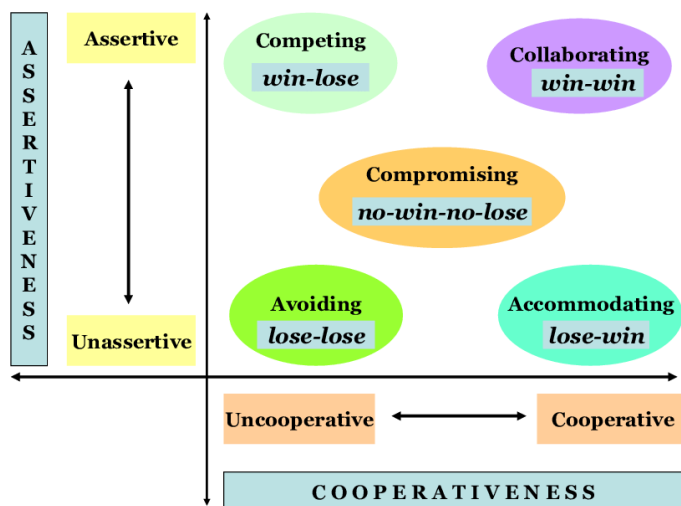


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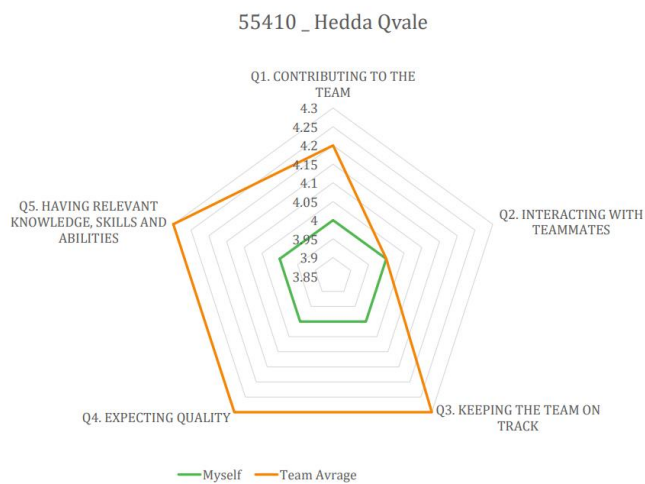
(Birkman 2019).

Figure 8: Dual Concern Model: Negotiation Strategy



(Awadallah 2018).

Figure 9: Team and personal evaluation



Appendix 3: List of abbreviations

Electric vehicles	EV
Internal combustion Engine	ICE
Weighted Average Cost of Capital	WACC
High Power Charger	HPC
Original Equipment Manufacturer	OEM