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1. Why does this immersion matter?

Manufacturing is where strategy meets reality. Capacity bets, supply chain trade-offs, and automation choices are easy to discuss in a classroom and much harder to see actually playing out on a shop floor, where every decision shows up as a queue of unfinished product, an idle machine, or a worker doing a task a robot could do instead. This immersion is a chance to test the ideas you already know against a real, working factory rather than a case-study version of one.

Havells traces back to 1958, when Qimat Rai Gupta set up an electrical trading shop in Old Delhi, later building the company around switchgear, cables, and wiring devices before expanding into fans, lighting, and water heaters over the following decades. The real move into consumer durables came in 2017, when Havells acquired Lloyd, a long-standing but underinvested appliances brand, with the intent of turning it into a full-stack player spanning air conditioners, washing machines, refrigerators, and televisions. Ghiloth, commissioned the following year, is the manufacturing base built to support that bet, giving a brand still early in its turnaround a purpose-built plant to compete against rivals with decades more manufacturing history behind them.

Ghiloth is worth studying closely for reasons that aren't obvious until you look at the numbers. Lloyd, the brand made here, entered Havells' portfolio only in 2017, and competes today in a room-AC market so fragmented that even the leader, Voltas, holds barely 18 to 19% share among more than 65 rivals. Yet the plant currently runs its washing-machine line at just 52% utilisation while actively expanding capacity further and has separately committed ₹480 crore to build an entirely new refrigerator plant on the same site. That is a company spending real money well ahead of demonstrated demand in an industry where roughly three-quarters of what goes into every unit is still imported. Is that conviction or overreach? You won't know until you've asked the right questions on the floor or observed properly.

That combination of ambition and constraint, a young challenger brand making large, forward-looking bets inside a brutally competitive, import-dependent industry, is what makes Ghiloth worth studying rather than simply admiring. Plant visits can also be deceptively impressive: robots, AGVs, a control room full of dashboards. It's easy to leave with strong impressions and weak analysis. This pre-read gives you a set of ideas to carry in before you walk in, not frameworks to name-drop, but questions you should be able to answer with evidence by the time you leave.

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2. Company snapshot

#	Agenda	Details
1	Organisation Name	Havells India Limited
2	Industry/Sector	Consumer Electricals & Manufacturing
3	AC capacity	15 lakh units/year at commissioning
4	Washing machine capacity	6.8 lakh units/year at 52% utilisation; expanding to 8.3 lakh by Dec 2026
5	Refrigerators	New line, not yet operational; ₹480 cr investment, 14 lakh units/year, targeted Q2 FY27
6	Sustainability	IGBC Gold-rated Green Building Certification
7	City	Ghiloth, Rajasthan
8	Brief Description	Havells is one of India's leading electrical and consumer durable brands with a strong presence across wires, cables, switchgear, lighting, fans, and appliances. The Ghiloth facility is one of the company's flagship manufacturing plants and demonstrates how large-scale production, quality systems, and operational efficiency work together in a modern manufacturing environment.
9	Key Products/Services	Wires & Cables, Switchgear, Lighting Systems, Fans, Home Appliances, Electrical Infrastructure Products
10	Website	Havells India



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3. Porter's Five Forces: Why this industry behaves the way it does

Before judging any decision Havells has made at Ghiloth, let's understand the industry it competes in, since much of what looks like an aggressive or risky choice on the floor is actually a logical response to the market. Porter's 1979 argument is that an industry's structure, its rivalry, supplier and buyer power, entry barriers, and substitution risk shape what strategies make sense for firms within it. Applied to Ghiloth's segment:

- **Rivalry is intense.** The room-AC segment has 65+ competitors, and even market leader Voltas holds only around 18 to 19% share. No one dominates, so every player is fighting to grow their position rather than defend one.
- **Supplier power is high.** Roughly three-quarters of an India-assembled AC's value is imported, mostly from China, with the compressor alone close to 30% of the manufacturing cost. A few overseas suppliers hold real leverage over cost and schedule.
- **Buyer power is high.** Most Indian households still don't own an AC, so most buyers are first-time, price-sensitive purchasers comparing dozens of similar options, keeping pricing power with the customer.
- **Entry barriers are rising.** Duty hikes on fully-assembled ACs, a ban on pre-filled refrigerant imports, and the PLI scheme are closing off the pure-import route, pushing competitors toward real domestic manufacturing, exactly what Ghiloth represents.
- **Substitution is low for the core need and high within the category.** No substitute exists for cooling or laundering itself, but strong substitution happens within categories (window vs. split AC, semi- vs. fully automatic washing machines), pushing companies to expand their range.

This is a low-margin, import-exposed industry still figuring out who its loyal customers are. Havells seems to be using these pressures as much as defending against them: the refrigerator plant converts import dependence into more control; the washing-machine expansion, against 52% utilisation, reads as a bet to claim share while entry barriers rise; and automation investment helps a brand acquired only in 2017 compete against older rivals like Voltas and LG.

As you walk the floor, look for both readings: where is the plant reacting to pressure, and where is it turning that pressure into an advantage?

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4. Why do some factories chase "defects per million" instead of just "pass or fail"?

Most quality checks work on a simple pass/fail basis; a unit either meets spec or it doesn't. **Six Sigma**, developed at Motorola in the 1980s and later popularised by GE under Jack Welch, pushes further than that. Instead of asking "did this batch pass," it asks "how much variation exists in this process, and can we shrink it enough that defects become statistically rare", the name itself refers to a process so tightly controlled that it produces fewer than about 3.4 defects per million opportunities. The method follows a defined cycle: Define the problem, measure the current process, analyse where variation is coming from, improve the process, and control it so the improvement holds (known as DMAIC).

The reason this matters at Ghiloth is that it changes what "good quality" even means. A line can have a high first-pass yield today and still be a Six Sigma failure, if that yield is achieved through heavy inspection and rework rather than a process that's inherently consistent, inspecting out bad units after the fact is very different from a process tightly controlled enough that defects rarely occur in the first place.

5. Why is building capacity ahead of demand a bet?

Every factory has to decide how much capacity to build before it actually knows how much demand will show up. There are three broad ways to make that call.

- You can wait until demand is clearly there before adding capacity: it's safer for your cash, but you risk losing sales while you wait and watching competitors fill the gap.
- You can add capacity in small steps that closely track actual demand as it grows: it's a balanced approach, but it only works if your forecasts are genuinely accurate.
- Or you can build capacity well ahead of demand, betting that growth will arrive and fill it, which means spending money now for a payoff that isn't guaranteed, but if the bet is right, you own the market position before anyone else gets there.

Ghiloth's washing-machine line is a clear example of that third choice.

Capacity has grown from 3 lakh units a year at launch to 6.8 lakh units today, with a further expansion already approved that will take it to 8.3 lakh, and yet the plant is currently running at only 52% utilisation. In other words, the plant already has more room to produce than it's

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using, and it's still adding more. This isn't a company cautiously matching what the market wants right now; it's a company spending real money based on where it expects the market to be in a few years.

The useful question to carry onto the floor isn't whether this is a good decision in some abstract sense: it's what has to be true about Indian washing-machine demand over the next two or three years for this bet to actually pay off.

This also raises a second, related question. Ghiloth doesn't just make one product; it makes air conditioners, washing machines, and (soon) refrigerators, all on the same campus and all with very different demand patterns: AC sales spike sharply every summer, while washing machines and refrigerators sell at a much steadier, more predictable pace all year. Does putting all three on one site actually help the business with shared systems, shared logistics, and workers who can shift between lines when AC demand spikes, or are these really three separate manufacturing operations that just happen to share a fence line and a name?

6. How should a factory decide what to stock and how much?

Every factory holds inventory: raw materials waiting to be used, half-finished products moving between stations, finished goods waiting to be shipped out. None of that inventory is free. It ties up cash, takes up space, and can go out of date or get damaged sitting around. But holding too little inventory is just as costly in a different way; you run out, a line stops, or a customer doesn't get their order on time. The entire discipline of inventory management is really about finding the right balance between these two opposing risks for every single item a factory stocks.

Why factories order in batches instead of one unit at a time. Every time a plant places an order, whether that's a purchase order sent to a supplier or an internal changeover to switch a machine from making one part to another, it costs something. There's paperwork, there's the time a machine sits idle while it's reconfigured, and there's the cost of arranging transport for a smaller shipment instead of a full container. If you order very frequently, in small amounts, you keep very little inventory sitting around, which is good. But you pay these ordering costs over and over again, which adds up fast. If you order rarely, in large amounts, you pay those costs much less often but now you're sitting on a large pile of inventory for a long time, paying for the warehouse space, the capital tied up, and the risk that some of it becomes obsolete before it's used.

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The economic order quantity, or **EOQ**, is simply the order size that gets the best of both worlds, the point where the cost of ordering too often and the cost of holding too much roughly balance out. This idea was worked out almost a hundred years ago (Wilson, 1934) and is still the starting point most factories use to size their orders. It's not complicated to understand conceptually: as you order more at a time, ordering costs go down but holding costs go up, and somewhere in between is the sweet spot.

What makes this genuinely interesting to think about at Ghiloth is that the plant isn't managing one kind of inventory; it's managing at least two very different kinds at once. On one side, components like compressors and electronic controls are expensive, imported by sea from places like China, and take weeks to arrive once ordered. Roughly three-quarters of the value of everything that goes into an India-assembled air conditioner is imported like this, and the compressor alone accounts for close to 30% of the total manufacturing cost. On the other side, items like screws, packaging boxes, and local plastic parts are cheap, sourced nearby, and can usually be reordered within a day or two.

These two categories should logically be ordered on completely different schedules. The expensive, slow-to-arrive imported parts need careful advance planning, while the cheap, fast-to-arrive local parts can be reordered frequently with much less thought.

7. Why "we run on Just-in-Time" is a claim that needs testing, not accepting.

Just-in-Time, or JIT, means nothing gets made or moved until the next step in the process actually asks for it, rather than each station stocking up based on a forecast. This keeps inventory low and exposes problems immediately: a breakdown or defect is felt right away instead of being absorbed by a cushion of extra stock.

For JIT to actually work, two things must hold: demand at the point of pull has to be reasonably predictable, and suppliers have to deliver quickly and reliably once a signal goes out. If either breaks down, "JIT" becomes more of a label than an accurate description, which is why it's worth testing rather than accepting at face value when you hear it on the floor.

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8. How well a factory is actually performing and what "advanced" really means

This section is about reading the shop floor itself: how to tell whether a line is genuinely well-run and how to think honestly about what "modern" or "Industry 4.0" manufacturing actually means, rather than being impressed just because something looks technologically advanced.

Why every pile of unfinished product you see is a number, not just clutter.

There's a simple, provable relationship that holds true in every production system: the amount of work-in-progress sitting inside the system at any moment equals the rate at which the system is producing output, multiplied by how long each unit spends inside the system before it comes out the other end (this is known as **Little's Law**).

The practical meaning of this, standing on a factory floor, is that every stack of half-finished appliances sitting between two stations is not just a sign the factory is busy: it's money already spent, sitting still, not yet turned into a sellable product.

When you see a buffer building up somewhere, the right question isn't "why is there a queue here" as a vague observation; it's more specific: Is this a deliberate, planned buffer because of a real batching or changeover constraint, or is it simply evidence that one station is running faster than the next and nobody has fixed the mismatch?

Why a line full of robots can still be performing badly.

Overall Equipment Effectiveness, or OEE, breaks down how much of a machine's theoretical maximum output is actually realised as good, sellable product, by separating three kinds of loss:

1. availability loss (time the machine wasn't running at all: breakdowns, changeovers, waiting for material),
2. performance loss (time it was running slower than its full designed speed), and
3. quality loss (units produced that didn't pass inspection).

A machine's OEE is the product of all three, so a serious problem in even one of them can drag the overall number down badly, no matter how the other two look. This means a line can look extremely impressive; robotic arms, AGVs, a live dashboard and still have poor OEE if

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changeovers are slow, the line stops frequently, or a meaningful share of output gets rejected. The number of robots visible tells you almost nothing about actual performance.

What "Industry 4.0" actually means, and why it's not the same thing as "advanced".

Industry 4.0 refers to a specific set of technologies that connect machines, sensors, and systems so a factory has real-time visibility into what's happening on the floor, an MES that tracks production as it happens, robotic work-cells, AGVs moving material without a human driver, and dashboards that turn data into something a manager can act on.

Ghiloth has publicly described itself in these terms: an MES from Dassault, robotic cells, and AGVs, and this is a genuinely useful layer of technology. But it's worth being precise: connected, digitised, and visible are not the same thing as intelligent or self-correcting. A dashboard that shows a problem is happening is not the same as a system that predicts the problem before it happens or one that adjusts itself automatically in response.

This is exactly the gap that Industry 4.0 is built to capture. It lays out six stages a factory can progress through:

- computerising individual processes,
- connecting machines and systems together,
- gaining real-time visibility,
- developing transparency (understanding why something happened, not just that it did),
- building predictive capacity (anticipating problems before they occur), and
- finally adaptability (the system adjusting itself automatically).

Most factories that describe themselves as "Industry 4.0" have made real progress on the first three stages: digitised, connected, and visible, but far fewer have genuinely reached the last two, where the system predicts problems or reconfigures itself without a person deciding to intervene. That gap is the single most important thing to test for: ask for a specific, real example of a time the system predicted a problem before it happened or automatically changed something in response to changing conditions, rather than simply displaying information for a person to act on.

What "Industry 5.0" adds on top of Industry 4.0.

Industry 4.0 is about technology: connecting machines and building visibility into the floor. Industry 5.0, as framed by the European Commission in 2021, asks a different question: not "how much can we automate," but "what should the automation actually be for". It sits on top of

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4.0's technology is built around three ideas: keeping people central to the process rather than automating them away, building factories flexible enough to handle disruption rather than optimised for one fixed scenario, and treating sustainability as a real operating principle rather than a compliance checkbox.

Ghiloth gives you one data point to test this against: its IGBC Gold-rated Green Building certification. That tells you something about how the building itself was constructed, but not whether sustainability shows up in daily manufacturing decisions, like scrap recovery or machine-level energy monitoring. A green building and a green manufacturing process are different claims, worth asking your hosts to distinguish.

Don't treat Industry 5.0 as something to check off. It's a relatively new idea, and no Indian consumer-durables plant has likely implemented it fully. Use it instead as a lens for direction: does what you see suggest the plant is moving toward augmenting its workforce and building in flexibility, or is the current priority simply maximising throughput? Either answer is fine for a plant at this stage, but noticing which one is true tells you where Havells is headed next.



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9. Glossary

Term	Meaning
Porter's Five Forces	A framework for analysing an industry's structure through five factors: rivalry among competitors, supplier power, buyer power, threat of new entrants, and threat of substitutes.
EOQ (Economic Order Quantity)	The order size that balances the cost of ordering too frequently against the cost of holding too much inventory.
JIT (Just-in-Time)	A production approach where materials are made or moved only when the next step in the process actually needs them, rather than stocked up in advance.
Safety Stock	Extra inventory held beyond expected need, to absorb uncertainty in demand or supply without running out.
Little's Law	A formula stating that work-in-progress inside a system equals throughput multiplied by how long each unit spends in the system.
OEE (Overall Equipment Effectiveness)	A measure of how much of a machine's maximum possible output is actually realised as good product, broken into availability, performance, and quality losses.
Takt Time	The pace a line needs to run at to meet demand, calculated by dividing available production time by required output.
Cycle Time	The actual time a single station takes to complete one unit of work.
Six Sigma	A quality methodology aimed at reducing process variation so defects become statistically rare, targeting fewer than 3.4 defects per million opportunities.
DMAIC	The five-step cycle used in Six Sigma: Define, Measure, Analyse, Improve, Control.
MES (Manufacturing Execution System)	Software that tracks and manages production in real time on the shop floor.
AGV (Automated Guided Vehicle)	A driverless vehicle used to move materials around a factory floor.
Industry 4.0	The use of connected technology, sensors, and data systems to give a factory real-time visibility into its operations.
Industry 5.0	A framework emphasising human-centricity, resilience, and sustainability as the purpose behind manufacturing technology, rather than automation for its own sake.
IGBC (Indian Green Building Council)	The body that certifies buildings in India for environmentally sustainable design and construction.
Gemba Walk	A Japanese management practice of going to the actual place where work happens, to observe a process directly rather than relying on reports.

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10. Guiding Questions

1. How do you decide how much safety stock to hold for a fast-moving product like AC compared to a steady one like washing machines?
2. What's the plan for the refrigerator line once it's up and running? Will it share systems and workers with the other two lines, or run as its own separate operation, and what's driving that decision?
3. What was the last big problem on this floor, and how did you find out about it, from a system alert or from a person noticing?
4. What does automation actually replace here, a person's job entirely, or the hardest part of a person's job?
5. Looking at the current investment, would you say it's playing it safe or making a bet on the future? What convinced leadership to take that bet?

11. Questions to Keep in Mind While Observing on the Gemba Walk

1. Where do I see piles of unfinished product sitting around, and why is it building up there?
2. Are all the stations on a line moving at roughly the same pace, or is someone clearly waiting on someone else?
3. Are defects being caught at the end of the line, or is the process built so they don't happen in the first place?
4. Where is a machine doing a worker's job, and where is it just helping a worker do their job better?
5. Is this plant playing it safe, or is it making a real bet on where the market is going?

12. Resources to go through before Immersion:

1. [The price Havells paid to become a household name](#)
2. [QRG to Havells: Exploring the Business Empire of Quimat Rai Gupta | The Man Behind...](#)
3. [Havells Success Story - Most famous Consumer Electrical Appliances Company](#)
4. [India Limited: Transition from an Industrial Brand to a Consumer Brand - Neeraj Pandey, 2015](#)

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