Orientation by Chana Sir

AI in Product Development, Productivity & NPD

1) Purpose of this page

This page converts Chanabasagouda Sir's orientation into a structured technical + product-development knowledge base (not a transcript summary).

For each key concept, this page aims to capture:

- **What is it?**
- **Why is it used?**
- **How does it work (conceptually)?**
- **Where does it fit in product development?**
- **What problem does it solve?**
- **What is the business value?**

2) Information accuracy rules (how to read this page)

Primary source: the orientation transcript (as captured).

No silent corrections: If something seems wrong/ambiguous, it is labeled, not "fixed".

Labels used

- **CONFIRMED** — directly stated clearly.
- **LIKELY** — likely interpretation based on standard terminology.
- **INFERENCE** — derived from the discussion.
- **APPROXIMATE** — approximate number/claim.
- **UNCLEAR** — transcript is insufficient.
- **NEEDS CONFIRMATION** — verify with speaker/team.

Transcription uncertainty format

- **Possible transcription issue:** `[term]`
- **Likely interpretation:** `[interpretation]`

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3) High-level AI strategy (orientation conceptual map)

```
Havells AI
│
├── AI for Products
│
├── AI for Productivity
│
└── Platform Development
```

AI for Products

Meaning (CONFIRMED): AI integrated into products/features to improve user experience, diagnostics, automation, personalization, performance, and potentially product lifespan.

AI for Productivity

Meaning (CONFIRMED): AI solutions designed to solve specific workflow problems faced by Business Units (BUs), engineering teams, and employees.

Platform Development

Meaning (CONFIRMED): A common platform intended to support product-development / NPD processes.

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4) AI for Products

4.1 Simple meaning

AI that becomes part of the product experience (features, modes, diagnostics, proactive alerts).

4.2 Why it’s used

- Improve user experience and perceived intelligence of the product
- Reduce failures via better diagnostics and predictive alerts
- Enable automation/personalization at scale

4.3 How it works (conceptually)

- Use product data (sensor data, usage history, context like geography) to:
  - detect situations
  - predict issues
  - recommend or automatically perform actions

4.4 Where it fits in product development

- During feature definition (what AI feature should exist)
- During design/engineering (what sensors, compute, connectivity are needed)
- During validation and quality (failure modes, reliability, false alarms)

4.5 Examples mentioned (orientation-level)

AQI Prediction & Alerts

- **Status:** CONFIRMED as an example
- **Notes:** Explain only to the extent supported by the transcript.

Filter Clog Prediction

- **Status:** CONFIRMED as an example
- **Notes:** Explain only to the extent supported by the transcript.

AI Mode / Automatic Climate Control

- **Status:** CONFIRMED as an example

- **Notes:** Discussed as automatic climate-control/product behavior and future personalization.

Smart Diagnostic for Error Codes

- **Status:** CONFIRMED as an example
- **Notes:** Product-diagnostic use case (error-code interpretation/support).

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5) AI for Productivity

5.1 Meaning

AI built to solve a *specific* business/workflow problem (not "AI for the sake of AI").

5.2 Why it's used

- Reduce manual effort and cycle time
- Improve consistency in reviews/decisions
- Help teams focus on higher-value work

5.3 How it works (framework)

```
Work Problem
↓
Understand Workflow
↓
Identify Repetitive / Difficult Task
↓
Check Data Availability
↓
AI Solution
↓
Human Validation / Final Decision
↓
Productivity Improvement
```

5.4 Examples mentioned

- Resume screening (AI HR assistant)
- Student evaluation (project/history item)
- Artwork review
- Project management agent
- Engineering productivity

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6) Platform Development

6.1 Orientation meaning

Platform development was discussed as a newer area.

6.2 Conceptual relationship

```
AI
+
Product Development
+
NPD
↓
Common Platform
```

6.3 What this platform is intended to support

- Product-development workflows
- NPD workflows

Constraint: Do not invent platform architecture/implementation details not discussed.

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7) Business Unit (BU)

7.1 Meaning

BU = **Business Unit** (a product/business area that owns goals, priorities, and workflows).

7.2 Product/business areas mentioned

- AC
- PAD — **UNCLEAR** (exact expansion needs confirmation)
- Washing Machine
- Refrigerator
- Industry / Product Switchgear

7.3 Why BU context matters

AI use cases must map to the workflow + constraints of the specific BU (data availability, product constraints, business priorities, service/quality costs).

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8) Product development lifecycle (conceptual)

8.1 Visual flow

```
Idea
↓
Benchmarking / Competitor Analysis
↓
Industrial Design / Aesthetics
↓
Engineering
↓
Materials / Components
↓
Functionality / Performance
↓
Prototype
```

```
↓
Production
```

8.2 Note on “Stage 1 → Stage 7”

- **Status:** CONFIRMED that a 1→7 style process was referenced.
- **Status:** UNCLEAR for the exact official stage names (not established).
- **Rule:** Do not invent additional official stages.

8.3 Key lessons

- Product development is multidisciplinary.
- Design, engineering, manufacturing, quality, and business are connected.
- AI can contribute across stages (not only post-production).

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9) Design DNA

9.1 Meaning

A product/design identity that covers:

- appearance
- aesthetics
- identity
- functionality
- performance

9.2 Why it matters

Design and engineering jointly define the product’s identity and user experience (trade-offs between aesthetics, manufacturability, cost, and performance).

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10) Engineering roles (and AI productivity opportunities)

Role	General responsibility	Possible AI productivity opportunity
Software Engineer	Software development	AI coding/productivity
Backend Engineer	Backend systems	AI-assisted development
App Developer	Application development	AI-assisted development
DevOps Engineer	Deployment/infrastructure	AI productivity
CAD Engineer	Product design/engineering	CAD/design assistance
Industrial/Product Designer	Product appearance/design	Design assistance

Constraint: Do not invent specific tools/implementations. Principle: build productivity AI around the actual workflow of each role.

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11) BOM — Bill of Materials

11.1 Definition

BOM = a structured list of components/materials required to manufacture a product.

11.2 Example (conceptual)

```
AC
├── Compressor
├── Capacitor
├── PCB
├── Fan
├── Sensors
└── Other Components
```

11.3 Business importance

BOM supports:

- procurement

- vendor management
- quantity consolidation
- price negotiation
- material planning
- manufacturing

11.4 Shared components → negotiation leverage (concept)

```
AC Requirement
+
Refrigerator Requirement
↓
Identify Shared Components
↓
Combine Quantity
↓
Vendor Negotiation
↓
Potential Cost Reduction
```

Key business lesson: consolidating requirements can create purchasing leverage.

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12) Vendor management

12.1 Orientation idea

Different BUs may use different vendors for similar components. A centralized component view can enable:

- vendor consolidation
- vendor evaluation
- price negotiation
- quality improvement

12.2 Quality risk chain (concept)

```
Poor Component
↓
Product Failure
↓
Warranty / Service
↓
Replacement
↓
Company Cost
↓
Lower Margin
```

Principle: vendor quality must be evaluated alongside price.

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13) Procurement optimization

13.1 Meaning (orientation-level)

Optimize procurement by:

- identifying common components
- consolidating demand
- negotiating better prices
- reducing unnecessary vendor fragmentation
- maintaining component quality

13.2 Relationship map

```
BOM
↓
Component Information
↓
Demand Consolidation
```

```
↓
Vendor Management
↓
Negotiation
↓
Cost Optimization
```

---

14) COPQ — Cost of Poor Quality

14.1 Definition

COPQ = costs created because a product does not meet expected quality.

14.2 Example chain

```
Poor Component / Design
↓
Product Failure
↓
Warranty Claim
↓
Service Request
↓
Replacement
↓
Company Cost
```

14.3 Relationships

COPQ connects to:

- product quality
- warranty/service
- vendor management
- product reliability

- product economics
- DFMEA

Lesson: quality problems eventually become business-cost problems.

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15) DFMEA

15.1 Term noted in transcript

Transcript repeatedly mentions **DFMEA**.

- **LIKELY interpretation (NEEDS CONFIRMATION):** Design Failure Mode and Effects Analysis

15.2 Purpose (conceptual)

A method to identify potential design/product failures before production and prioritize risk-reduction actions.

15.3 Conceptual flow

```
Product Design
↓
Potential Failure Modes
↓
Risk Analysis
↓
Severity
+
Occurrence
+
Detection
↓
RPN
↓
Prioritized Actions
```

Constraint: do not claim a specific company implementation unless stated.

16) Severity, Occurrence, Detection

Severity

Impact if the failure occurs.

Occurrence

Likelihood/frequency of the failure occurring.

Detection

Ability to detect the failure before it reaches the customer.

Scoring scales: NEEDS CONFIRMATION (if not explicitly defined in the transcript).

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17) RPN — Risk Priority Number

17.1 Definition

RPN = Risk Priority Number.

17.2 Standard conceptual formula

```
RPN = Severity × Occurrence × Detection
```

17.3 Mentioned threshold

- **APPROXIMATE / UNCONFIRMED:** threshold around **100**

Use: prioritize risks requiring attention.

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18) DFMEA Agent

18.1 Purpose

An AI agent intended to assist engineers with identifying potential product/design faults and risks.

18.2 Conceptual architecture

```
Product Design
↓
AI / DFMEA Agent
↓
Potential Failure Modes
↓
Risk Analysis
↓
Severity / Occurrence / Detection
↓
RPN
↓
Recommended Actions
↓
Human Review
```

18.3 Autonomy note

Do **not** describe as fully autonomous unless explicitly confirmed. Likely human-in-the-loop due to engineering decision criticality.

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19) NPD — New Product Development

19.1 Definition

NPD = New Product Development.

19.2 Conceptual flow

```
Idea
↓
Design
↓
Engineering
```

```
↓
Materials
↓
Prototype
↓
Risk Analysis
↓
Testing
↓
Manufacturing
```

19.3 Relationships

Connects to:

- product development lifecycle
- DFMEA / RPN / COPQ
- BOM
- CAD
- AI platform
- engineering change

---

20) ECN — Engineering Change Notification

20.1 Definition

ECN = Engineering Change Notification.

20.2 Conceptual distinction discussed

```
New Product
↓
NPD

Existing Product
```

```
+
Engineering Change
↓
ECN
```

---

21) CAD — Computer-Aided Design

21.1 Definition

CAD = Computer-Aided Design.

21.2 Relevance

Used for:

- product dimensions
- geometry
- engineering design
- product specifications
- artwork
- manufacturing

21.3 Conceptual relationship to artwork review

```
CAD / Product Specification
↓
Product Information
↓
Artwork
↓
AI Artwork Review
```

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22) SKU — Stock Keeping Unit

22.1 Definition

SKU = Stock Keeping Unit.

22.2 What SKU-specific information may include (orientation-level)

- product dimensions
- technical specifications
- product details
- CAD-related information

Connects to product identification, artwork, and documentation.

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23) AI Artwork Review

23.1 Problem

Artwork/packaging review involves multiple stakeholders (e.g., legal, engineering, others).

23.2 Timeline numbers mentioned

- **APPROXIMATE discussion estimate: 2–3 weeks** for review process (not validated production metric)
- **TARGET / discussion estimate: 30–60 minutes** (not validated actual performance)

23.3 AI workflow (concept)

```
Artwork
↓
AI Review
↓
Check Product Information
↓
Identify Issues
```

```
↓
Human Validation
↓
Approval / Correction
```

---

24) AI HR Assistant (resume screening)

24.1 Use case

```
Resumes
↓
AI Screening
↓
Shortlisting
↓
Human Review
```

Goal: reduce manual screening effort. Constraint: do not invent model architecture/metrics.

---

25) Student evaluation (project/history item)

Orientation notes

- **CONFIRMED (as described):** initially developed by the speaker and Arvind
- **CONFIRMED (as described):** later continued by Arvind and another person

Do not invent additional functionality.

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26) Project Management Agent

- **Status:** Early-stage / initial AI use case
- **OPEN — NEEDS CLARIFICATION:** exact functionality not sufficiently described

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27) AI Mode / automatic climate control (orientation-level)

- **Status:** CONFIRMED as an AI-for-Products example
- Relates to automatic product behavior; personalization and future enhancements were discussed.

Constraint: do not import architecture from other project knowledge bases.

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28) AI Mode 2.0 / Personalization (future-oriented)

28.1 Conceptual flow

```
User History
+
Current Temperature
+
Geographic Information
+
Similar Users
↓
Personalization
↓
Recommendation Engine
↓
AI Mode Decision
```

28.2 Potential approaches mentioned (NEEDS CONFIRMATION)

- similar-user identification
- recommendation engine
- clustering
- geographic information / geofencing
- “content and collaborative”

- **Likely interpretation (NEEDS CONFIRMATION):** content-based filtering + collaborative filtering

Do not claim these techniques are already implemented.

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29) Personalization

Definition

Adapting product/system behavior based on user-specific or contextual information.

Why it matters

- users behave differently
- regions have different environmental conditions
- a single global rule may not work optimally everywhere

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30) Clustering

Clustering groups users/data points that are similar according to selected features.

- **Status:** FUTURE / PROPOSED CONCEPT — NOT CONFIRMED AS IMPLEMENTED

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31) Geofencing

Geofencing uses geographic boundaries/location context to influence system behavior.

Orientation discussed regional differences (e.g., Chennai, Bangalore, Northeast India).

Constraint: do not assume a specific implementation.

---

32) Recommendation engine

A recommendation engine generates personalized suggestions/decisions based on user info, historical behavior, similar users, and context.

If the exact methodology (content-based/collaborative) is mentioned, mark it as NEEDS CONFIRMATION unless explicit.

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33) Sensor data reliability (engineering principle)

```
Sensor
↓
Measurement
↓
Potentially Incorrect Data
↓
Bad Input
↓
Bad Decision
```

Lesson: AI systems should not blindly trust sensor data. Connects to telemetry, data validation, rule-based systems, ML systems.

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34) AI product decision framework (HIGH PRIORITY)

```
AI Idea
↓
Technical Feasibility?
↓
Data Available?
↓
Customer Useful?
↓
Business Valuable?
↓
Competitive Advantage?
↓
```

```
Cost Acceptable?
↓
Fits Product?
↓
Should We Build It?
```

Core principle: don't ask only "Can we build it?" — also ask "Should we build it?"

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35) "Wear multiple hats" (evaluation mindset)

When evaluating an AI idea, consider multiple perspectives:

- **Engineering:** can we build it? what data/architecture is needed?
- **Product:** does it improve product/UX?
- **Customer:** does it solve a real problem? will users use it?
- **Business:** measurable value (revenue/cost/margin/retention/service)
- **Manufacturing:** BOM impact, complexity
- **Quality:** reliability, new failure modes
- **Cost:** cloud/inference/hardware/telemetry/warranty/service/ops

---

36) Product economics & cost (orientation framework)

```
Product Economics
├── Manufacturing Cost
├── BOM Cost
├── Hardware Cost
├── Cloud Cost
├── Telemetry Cost
├── AI Inference Cost
├── Warranty Cost
├── Service Cost
```

```
├── Operations Cost
└── Maintenance Cost
```

Lesson: AI cost should not be evaluated in isolation.

---

37) AI feature and BOM

AI physically integrated into the product

```
AI Hardware / Component
↓
BOM
↓
Manufacturing Cost
↓
Product Economics
```

AI as an app/service/cloud feature

```
App / Cloud / Service
↓
Operational Cost
```

Even if not in the physical BOM, it can create ongoing costs.

---

38) Business value framework

For each AI use case, evaluate:

Dimension	Question
Customer Value	Does it solve a real customer problem?
Product Value	Does it improve the product?
Business Value	Does it create measurable business value?
Cost	What does it cost?

Dimension	Question
Quality	Does it improve reliability?
Service	Can it reduce unnecessary service?
Productivity	Does it reduce manual work?
Differentiation	Does it improve competitiveness?
Scalability	Can it scale?

Model:

```
AI Technology
↓
Capability
↓
Workflow / Product Improvement
↓
Customer / Business Value
```

---

39) Build vs buy thinking

When deciding build internally vs external solution, consider:

- control, integration, customization, branding
- dependency/vendor lock-in
- development effort, cost, long-term maintenance

Lesson: the technically easiest solution isn't automatically the best product/business solution.

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40) Platform dependency (risks)

Risks of dependence on external platforms:

- availability
- pricing changes
- API changes

- behavior changes
- vendor lock-in
- limited customization
- reduced control

Connect this to build-vs-buy decisions.

---

41) Product development + AI map (combined view)

```
PRODUCT DEVELOPMENT
│
├── Idea
├── Benchmarking
├── Design
│   └── CAD
├── Engineering
│   └── BOM
├── Risk / Quality
│   ├── DFMEA
│   ├── RPN
│   └── COPQ
├── Prototype
├── Testing
└── Production

AI LAYER
│
├── AI for Products
│   ├── AQI Prediction
│   ├── Filter Clog Prediction
│   ├── AI Mode
│   └── Smart Diagnostics
│
├── AI for Productivity
```

```
│   ├── Resume Screening
│   ├── Student Evaluation
│   ├── Artwork Review
│   └── Project Management Agent
│
└── Platform Development
    └── NPD Platform
```

42) Concept relationship map (why concepts connect)

42.1 BOM → procurement → cost

```
BOM
↓
Components
↓
Vendor Management
↓
Procurement
↓
Cost
```

Why related: BOM drives component choices; vendor choices affect quality and price; procurement decisions affect total product economics.

42.2 Design/CAD → risk reduction → quality cost

```
Product Design
↓
CAD
↓
DFMEA
↓
RPN
↓
```

```
Risk Reduction
↓
COPQ
```

Why related: design decisions create potential failures; DFMEA helps identify and prioritize; reducing risk reduces poor-quality costs.

42.3 NPD → end-to-end product creation

```
NPD
↓
Product Development
↓
Design
↓
Engineering
↓
Prototype
↓
Production
```

Why related: NPD is the umbrella process that connects these stages.

42.4 AI → product + productivity + platform

```
AI
↓
AI for Products
+
AI for Productivity
+
Platform Development
```

Why related: orientation positioned AI as both product-facing and internal workflow-facing, supported by common platforms.

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43) Concept priority (study plan)

HIGH PRIORITY

- AI for Products
- AI for Productivity
- Platform Development
- Business Unit
- Product Development Lifecycle
- BOM
- COPQ
- DFMEA
- RPN
- NPD
- AI Agents
- Personalization
- Business Value
- Cost-benefit thinking

MEDIUM PRIORITY

- CAD
- SKU
- ECN
- Vendor Management
- Procurement Optimization
- Clustering
- Recommendation Engine
- Geofencing

- Artwork Review
- Sensor Data Reliability

44) Open questions (to clarify with team/speaker)

Question	Related concept	Status	Why it matters
What is the exact internal expansion/definition of DFMEA?	DFMEA	NEEDS CONFIRMATION	Ensures correct process alignment
Was DFMEA or DFMA intended?	DFMEA/DFMA	NEEDS CONFIRMATION	Avoids mixing two different methodologies
What are the exact Severity/Occurrence/Detection scoring scales?	DFMEA/RPN	NEEDS CONFIRMATION	Needed to interpret RPN correctly
Is the RPN threshold around 100 official?	RPN	NEEDS CONFIRMATION	Determines which risks require action
What does BU “PAD” stand for?	BU	NEEDS CONFIRMATION	Correctly maps use cases to BU workflows
What was meant by “AI based product stacking and statem…”?	(unclear term)	UNCLEAR	Avoids wrong assumptions
What exactly does the Project Management Agent do?	AI productivity	OPEN	Needed for scoping and evaluation
What recommendation methodology is planned for AI Mode 2.0?	Personalization	NEEDS CONFIRMATION	Determines data needs and feasibility
Does “content and collaborative” mean content-based + collaborative filtering?	Recommendation	NEEDS CONFIRMATION	Avoids mislabeling the method
What is the exact role/function of Deploy.ai?	(tool/platform)	NEEDS CONFIRMATION	Impacts platform/build-vs-buy decisions

Question	Related concept	Status	Why it matters
Is the DFMEA Agent human-in-the-loop?	AI agent	NEEDS CONFIRMATION	Safety/quality governance
Are the 2–3 week artwork-review numbers actual or approximate?	Artwork review	NEEDS CONFIRMATION	Sets realistic expectations
Is the 30–60 minute AI artwork review a target or actual result?	Artwork review	NEEDS CONFIRMATION	Evaluates ROI and feasibility

45) Unclear / incomplete terms (do not guess)

PAD

- **Status:** UNCLEAR
- Orientation mentions PAD as a BU/product area, but expansion not established.

DFMA vs DFMEA

- Transcript appears to mention both.
- **Question:** Was “DFMA Agent” a separate concept, or was DFMEA intended?

Product stacking / “statem…”

- Transcript ends around: “AI based product stacking and statem…”
- **Status:** UNCLEAR — NEEDS ORIGINAL AUDIO / CONFIRMATION

46) Real-world engineering lessons (concise)

1. AI is not only about ML models.
2. Product context matters.
3. Customer value matters.
4. Business value matters.
5. Cost matters.

6. Data availability matters.
7. Technical feasibility is not enough.
8. AI should solve real workflow problems.
9. Quality problems become business costs.
10. Vendor quality matters.
11. Product development is multidisciplinary.
12. AI can contribute throughout the product lifecycle.
13. Human validation can remain important.
14. Sensor data should not automatically be trusted.
15. AI does not necessarily mean machine learning.
16. Engineers should understand product economics.
17. Build-vs-buy decisions require multiple dimensions.
18. An AI engineer should think across engineering + product + business + customer + quality + manufacturing.

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47) Interview / discussion questions (based only on orientation concepts)

Product development

- What is NPD?
- What is the product development lifecycle?
- What is BOM?
- What is CAD?
- What is SKU?
- What is ECN?

Quality

- What is DFMEA?
- What is RPN?
- What are Severity, Occurrence, and Detection?
- What is COPQ?
- How can DFMEA reduce COPQ?

AI

- What is AI for Products?
- What is AI for Productivity?
- What is an AI Agent?
- What is personalization?
- What is clustering?
- What is a recommendation engine?
- What is geofencing?

Business

- How do you evaluate whether an AI idea should be built?
- Why does cost matter in AI product development?
- How can BOM optimization reduce cost?
- Why is vendor quality important?
- What is the difference between technical feasibility and business feasibility?

Product AI

- How can AI be used in product development?
- How can AI help with artwork review?
- How can AI help engineers?
- How can AI improve product personalization?

48) Quick revision (compact)

- **AI for Products** → AI integrated into products/features.
- **AI for Productivity** → AI solving employee/workflow problems.
- **Platform Development** → Common platform supporting product-development processes.
- **BU** → Business Unit.
- **BOM** → Components/materials required to build a product.
- **COPQ** → Cost caused by poor quality.
- **DFMEA** → Identify potential design failures and prioritize risk reduction. *(LIKELY name; confirm internally)*
- **RPN** → Severity × Occurrence × Detection.
- **NPD** → New Product Development.
- **ECN** → Engineering Change Notification.
- **CAD** → Computer-Aided Design.
- **SKU** → Stock Keeping Unit.
- **AI Agent** → AI system that assists with a task/workflow.
- **Personalization** → Adapt behavior based on user/context.
- **Clustering** → Group similar users/data.
- **Recommendation Engine** → Generates personalized recommendations.
- **Geofencing** → Uses geographic context/boundaries.
- **Product Economics** → Evaluate the total cost/value of a product feature.

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49) Orientation takeaways — what I should remember

1. **AI is bigger than ML models.** It applies to products, engineering, productivity, quality, procurement, and business workflows.
2. **Start with the problem.**

```
Problem
↓
Customer / Business Need
↓
Data
↓
Technical Feasibility
↓
AI Solution
↓
Value
```

3. **Think like a product engineer:** Customer + Product + Engineering + Business + Manufacturing + Quality + Cost.
4. **Understand the complete product lifecycle:** Idea → Design → Engineering → Materials → Prototype → Testing → Production.
5. **Build AI when it creates meaningful value**, not just because AI is available.