1. **Pareto Chart — Automotive fasteners (manufacturing)**
   Problem: High defect rates across multiple defect types.
   Action: Pareto analysis to identify top defect types.
   Outcome: Identified ~70–80% of defects coming from one cause; targeted corrective actions cut defects substantially.

2. **Fishbone (Ishikawa) + Five-Whys — Packaged snacks (food industry)**
   Problem: Recurrent contamination incidents in snack packaging lines.
   Action: Fishbone diagram (6M categories) + Five-Whys root-cause sessions with operators.
   Outcome: Found cleaning/maintenance lapses; revised SOPs and schedules → contamination fall by ~50–60%.

3. **Control Charts ($\bar{X}$ & R) — Textile dyeing process**
   Problem: Inconsistent fabric shades causing customer rejections.
   Action: Implemented X-bar and R control charts to monitor dye concentration & batch parameters.
   Outcome: Detected assignable causes early; process variation stabilized and complaints dropped significantly.

4. **Process Capability (Cp/Cpk) — Automotive assembly / crimping operation**
   Problem: Need to confirm if a process meets customer tolerances.
   Action: Conducted capability study (Cp, Cpk) with production data.
   Outcome: Process found capable after centering and reduced variation; specification compliance improved.

5. **FMEA (Failure Mode & Effects Analysis) — Healthcare process rollout**
   Problem: Risk of failures when introducing new clinical process or device.
   Action: Multidisciplinary FMEA to identify potential failure modes and mitigation actions.
   Outcome: Early identification and mitigation of high-risk steps; reduced adverse events during rollout.

6. **5S Implementation — Small manufacturing / SME plant**
   Problem: Poor workplace organization, long search times, and cluttered flows.
   Action: 5S (Sort, Set in order, Shine, Standardize, Sustain) pilot in shop floor.
   Outcome: Improved space utilization, shorter lead times, fewer process delays — measurable productivity gains in SMEs.

7. **Six Sigma DMAIC — Large enterprise & scaled lessons for MSMEs**
   Problem: Chronic process variation and cost of poor quality.
   Action: DMAIC projects (Measure → Analyze → Improve → Control) targeting high-cost defects (Motorola/GE examples).

Outcome: Documented millions in savings at large firms; MSMEs adopt scaled DMAIC projects for targeted ROI.

8. **Design of Experiments (DoE) — Pharmaceutical method / formulation optimization**
   Problem: Optimize formulation/process parameters for consistent product performance.
   Action: DoE (full/fractional factorial) to screen and optimize key factors.
   Outcome: Faster route to robust formulation and reduced development time/variability.

9. **Pareto + P-Control Chart + Fishbone — Consumer goods sachet production**
   Problem: High defect counts in sachet filling & sealing.
   Action: Pareto to prioritize defects, P-control charts for attribute monitoring, fishbone for root cause.
   Outcome: Targeted fixes reduced defect rates significantly (case documented in industry paper).

10. **SPC (Statistical Process Control) — Electronics board assembly**
    Problem: High rework and soldering defects in PCB assembly.
    Action: Implemented SPC (control charts) on soldering temperature, wave parameters, and throughput.
    Outcome: Early detection of shifts, reduced rework and scrap. (Industry SPC best practices & case references).

11. **Root Cause & Kaizen Blitz — Food supply chain / urban farming resilience**
    Problem: Distribution losses and inconsistent yields for urban farms.
    Action: Root cause mapping (fishbone) + Kaizen blitz to improve handling & packaging.
    Outcome: Waste reduction and improved resilience in supply chain operations.

12. **Kanban / Visual Management — Small assembly MSME**
    Problem: Overproduction and inventory piles.
    Action: Implemented Kanban pull system and visual work boards for small production lines.
    Outcome: Reduced WIP, lower inventory carrying cost, improved on-time delivery. (Common lean case examples — scalable to MSMEs).

13. **DOE + SPC — Chemical process scale-up**
    Problem: Variation during scale-up from lab to pilot plant.
    Action: Use DoE to determine key parameters and SPC for process control in pilot runs.
    Outcome: Controlled scale-up with predictable quality and fewer pilot failures.

14. **Multimodal RAG-style approach — Documented QA improvements (digital)**
    Problem: Operators lack quick access to SOPs and defect history.
    Action: Digital indexing + retrieval (RAG) of QA documents and case notes; recommend tools based on content.
    Outcome: Faster problem diagnosis and standardization of corrective actions (matches your system approach).

15. **Inspection Plan + Control Chart — Textile finishing line**
    Problem: End-of-line rejections due to finishing variability.
    Action: Implemented inspection plan with control charts for key finishing parameters.
    Outcome: Reduced batch rejections and better supplier/customer satisfaction.

16. **Lean + 5S + Visual SOPs — Plastic bag manufacturing SME**
    Problem: Low throughput and chaos in material flow.
    Action: Combined 5S and visual SOPs with Kaizen events.
    Outcome: Notable improvement in throughput and process discipline; documented in industrial case study.

17. **FMEA + Checklists — Medical device production**
    Problem: Risk of assembly errors causing safety incidents.
    Action: FMEA for assembly steps + operator checklists and poka-yoke devices.
    Outcome: Reduced assembly errors and regulatory risk.

18. **Pareto for Service Defects — Call-centre / service MSME**
    Problem: Frequent complaint categories leading to churn.
    Action: Pareto of complaint types, targeted training and process changes for top causes.
    Outcome: Improved first-call resolution and reduced repeated complaints. (Service-sector Pareto application is common).

19. **Measurement System Analysis (MSA) + Cp/Cpk — Precision machining shop**
    Problem: High reported variation from measuring equipment.
    Action: MSA (gage R&R) then capability study to separate measurement vs process variation.
    Outcome: Improved measurement reliability; accurate Cp/Cpk evaluation led to targeted process improvements.

20. **Case: Small Food Processor — Combined QC tools**
    Problem: Multiple quality issues (fill weights, foreign particles, sealing).
    Action: Quick Pareto to prioritize, control charts for fill weight, fishbone for foreign particles, 5S for line cleanliness.

Outcome: Rapid improvements across all problem categories within months (research-backed case studies exist).

21. **Case: Pharma stability & shelf-life studies — DoE + SPC**
    Problem: Drug shelf-life variability across batches.
    Action: DoE to select formulation/process variables, SPC for ongoing batch control.
    Outcome: More robust shelf-life performance and regulatory compliance.

22. **MSME Lean Transformation — Footwear cluster / industrial park examples**
    Problem: Fragmented MSME operations lack standardized QA.
    Action: Shared common facility centres, training in lean/5S and Kaizen across cluster.
    Outcome: Improved productivity, shared QA resources — model used in regional MSME clusters.