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TRAINING MANUAL · FREE PREVIEW EDITION

Lean Six Sigma Green Belt

For contact centers and shared-services centers (HR, finance, procurement): flow, measurement, statistics and control, with worked cases, AI prompt tips, Minitab and Excel practice, and an internal certification path.

Free preview · September 2026

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ABOUT THIS MANUAL

Rights, disclosures and how to use this manual

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Disclosure on the use of AI

This manual was drafted with the help of an AI writing assistant. The structure, examples, data and wording were then reviewed, corrected and approved by the human author, who is responsible for its content. Every calculation in the worked examples was re-computed during that review.

About the cases and data

The cases come from real operating challenges in contact centers and shared-service centers. To honor confidentiality agreements, **client names, people and figures have been changed or anonymized**, and the data sets were rebuilt to illustrate the method without exposing any client. The organization names (*Cordavelle Contact Center*, *Tellurix Mobile*, *Brinmoor Business Services*, *Pellavix Software*, *Lumaquay Marketplace*) are placeholders. They were checked against public sources and do not refer to any real organization.

Where external facts are used

Methods, formulas and thresholds that come from published sources (for example Erlang C, Little's Law, attribute-agreement guidance, or research on mistake-proofing services) are cited in Appendix G.

Independence and trademarks

This is an independent training manual. It is not affiliated with, endorsed by, or derived from the proprietary materials of any certification body, standards organization or employer. Names such as Six Sigma, Minitab and Microsoft Excel belong to their owners and are mentioned only to describe methods and tools.

The internal certification

Completing this course, passing the written exam and having a real improvement project approved leads to the author's **internal Green Belt certification**. It certifies competence inside the sponsoring organization. It is **not** an accredited third-party certification.

Before you start

This course assumes the author's **Yellow Belt** content: the four voices, trend and scatter charts, basic statistics, histograms and CV, process sigma, Pareto, SIPOC, fishbone and DMAIC. Module 1 recaps it in one page.

How to read the boxes

KEY IDEA

The concept to remember.

TRY IT

A short exercise. The answers are in Appendix F.

WATCH OUT

A common mistake in service operations.

AUTHOR'S FIELD NOTE

A lesson from the author's own work in real operations.



MIND MAPS

The course mind map is the table of contents; each part opens with its own map; each module starts with a small "where you are" map.

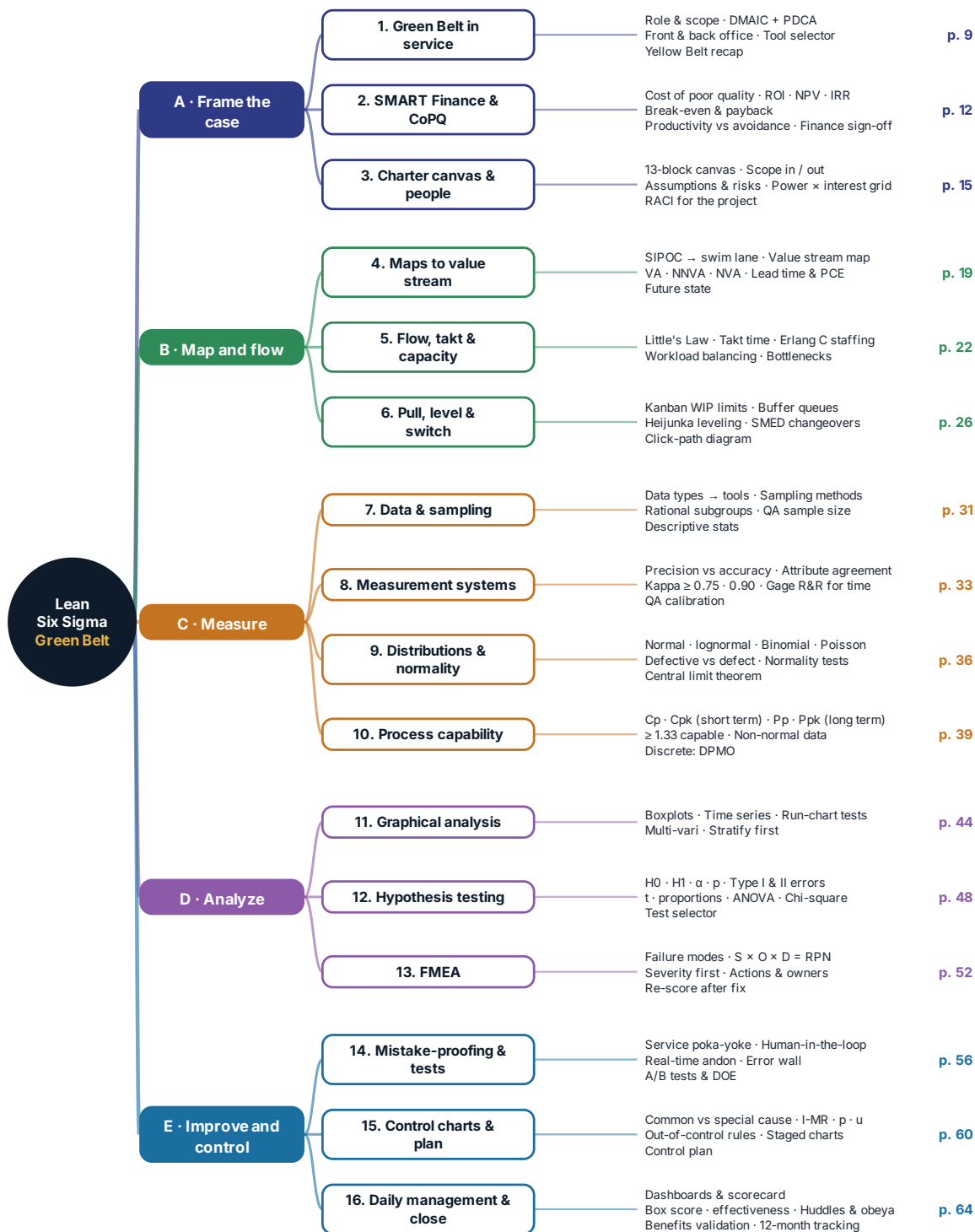
Also in every module: an *In plain words* summary, an *AI prompt tip* inside each exercise, *Technical corner* boxes for formulas and *Practice with software* boxes (Minitab, Excel, AI). See the AI study guide.



CONTENTS

Course mind map

All modules in five parts. Page numbers are on the right. The appendices start on page 66.





BEFORE YOU START

Who this is for and how the course runs

Who this is for

Team leaders, quality and process analysts, workforce planners, trainers and operations managers who will **lead improvement projects** in contact centers and shared-service centers. That covers customer care, technical support, collections, sales, seller or partner support, and back-office services such as HR, accounts payable and order management.

What you will be able to do

1. Build a business case in the language of finance: cost of poor quality, ROI, NPV, payback.
2. Map a value stream, find where time is lost, and size capacity with takt time, Little's Law and Erlang C.
3. Apply pull, leveling and fast changeovers to queues of cases, tickets and invoices.
4. Check that your data and your quality evaluators can be trusted before you analyze anything.
5. Measure capability for normal, skewed and pass/fail data.
6. Prove or disprove causes with graphical analysis and hypothesis tests, and prioritize risks with FMEA.
7. Mistake-proof services, run simple experiments, and hold the gain with control charts and daily management.
8. Lead a DMAIC project from charter to finance-validated benefits.

Suggested format and certification path

Step	Content	Evidence
Days 1–2	Modules 1–8	Business case, value stream map and attribute-agreement study on own data
Days 3–4	Modules 9–16	Capability study, one hypothesis test, FMEA and a control chart on own data
Written exam	60 questions, 3 hours, open formula sheet	Pass mark 80%
Project (3–6 months)	One DMAIC project with a coach	Scored with the project rubric; benefits signed by Finance
Certification	Exam passed + project approved	Internal Green Belt certificate with a unique ID



THE ORGANIZATIONS USED IN THIS MANUAL

Cordavelle Contact Center	450-seat multichannel BPO serving Tellurix Mobile (telecom) on billing, tech support and sales lines. Continues from Yellow Belt.
Brinmoor Business Services	Finance shared-services center: invoice-to-pay for several client companies.
Pellavix Software	A global software company. Its <i>People Services</i> hub is an HR shared-services center organized in tiers: employee self-service portal (Tier 0), a multilingual HR contact team (Tier 1), subject-matter specialists for payroll, benefits and immigration (Tier 2), and centers of expertise with HR business partners (Tier 3), plus a transactions team for hiring, onboarding, changes and exits.
Lumaquay Marketplace	A large e-commerce marketplace. Its seller-support center helps third-party sellers by email, chat and phone with listings, payouts, account health and disputes.

The tiered HR model above is the common "HR operating model" used by many large employers; it is described generically and does not represent any specific company.

Where this course sits in the belt path

Belt	Role	In plain words: what they typically lead
Yellow Belt	Reads and presents data correctly, spots real problems, joins improvement teams	Improvements inside one small-to-medium team : a queue, a shift or a team of 10–25 people
Green Belt CURRENT COURSE	Leads DMAIC projects in their own area with statistical and Lean tools	A larger team, a whole department or a client program , e.g. a 150-seat line of business or an AP team
Black Belt	Leads complex cross-area projects, coaches Green Belts, links projects to strategy	Full accounts, sites, regions or the organization's project portfolio
Master Black Belt	Designs and runs the improvement program; trains and certifies Black Belts; sets method and standards	The improvement system across several business units, countries or organizations , including building the program itself

ABOUT THE AUTHOR

Juan Carlos Munguia Salcido is a continuous-improvement consultant and **Lean Six Sigma Master Black Belt** specializing in customer experience, voice-of-the-customer strategy and service excellence in contact-center and shared-service operations. He has led quality, service-excellence and process-improvement teams for global BPO, technology and ride-hailing operations in Mexico and Latin America, designs and coaches improvement programs, and has a degree in Business Psychology (Universidad TecMilenio). He writes the LinkedIn newsletter *CX Hub Excellence Insights*.



BEFORE YOU START · AI STUDY GUIDE

Learning with your own AI study project

Today most of the arithmetic in this manual can be done in seconds by an AI assistant, a spreadsheet or Minitab. What still needs a trained person is **knowing what to ask, choosing the right tool, checking the answer and deciding what to do**. This guide sets up an AI "study coach" that knows this course, and the rest of the manual gives you a ready-made prompt for every exercise.

HOW THIS MANUAL HELPS YOU USE AI

- **In plain words** boxes open every module.
- Every **Try it** exercise has an **AI prompt tip** you can paste and adapt.
- **Technical corner** boxes hold the formulas: read them to understand, and let the tools calculate.
- **Practice with software** boxes give Minitab, Excel and AI routes with a dataset to check your results.

BEFORE YOU UPLOAD ANYTHING

- Upload only the **study companion** (JC_Munguia_LSS_Green_Belt_AI_Study_Companion_EN.txt), not this manual or client files.
- Never paste client names, customer or employee personal data. Anonymize, as this manual does.
- Check the training setting: Claude "Help Improve our AI models"; ChatGPT "Improve the model for everyone"; Gemini "Keep Activity".
- Follow your organization's AI policy. AI can be wrong: verify every number.

1. Create the study project

	Claude · Projects	ChatGPT · Projects	Gemini · Gems
Who can use it	All users; free accounts up to five projects	Signed-in users; files per project: 5 (Free), 25 (Go, Plus), 40 (Pro, Business, Enterprise, Edu)	Google accounts; create and edit Gems in the Gemini web app
Create	Sidebar > <i>Projects</i> (or <i>claude.ai/projects</i>) > + <i>New Project</i> > name it	Sidebar > <i>New project</i> > name, icon and color	Sidebar > <i>Explore Gems</i> > <i>New Gem</i> > name it
Add the companion	+ in project knowledge > upload the .txt file	Add files to the project (or paste text)	<i>Knowledge</i> > upload the file, or <i>Add from Drive</i>
Add instructions	<i>Set project instructions</i> > paste > <i>Save instructions</i>	⋮ > <i>Project settings</i> > paste the instructions	Paste into <i>Instructions</i> > test in the preview > <i>Save</i>
Also possible	—	Custom GPTs, only in Business, Enterprise or Edu workspaces	Gemini Notebook (formerly NotebookLM) for answers grounded in your sources

Menus as described in each vendor's help center in September 2026; labels change often. Save the companion as **.txt**: all three tools accept it. Links in the sources appendix.



2. Paste these project instructions

You are my Lean Six Sigma Green Belt study coach for customer-service and shared-services operations (contact centers, and HR, finance and procurement services).

Use the attached study companion as your main source. If something isn't in it, say so and label it as general knowledge.

When I work on an exercise: (1) ask for my own answer or data first; (2) guide me step by step instead of giving the answer straight away; (3) show every calculation so I can check it, and tell me how to do it in Excel or Google Sheets, or Minitab; (4) never invent company data: use placeholders like [monthly volume]; (5) flag any number I should double-check.

Keep answers short and practical, use tables to compare options, and reply in the language I write in.

Remind me not to paste confidential client or personal data. If my data looks sensitive, ask me to anonymize it first.

3. Prompt like a professional

Two formulas cover most needs. **RTF** is quick; **CREATE** is for bigger tasks. Both appear in the prompt tips of this manual.

Formula	Parts	Example
RTF	Role: who the AI should be · Task: exactly what to do · Format: how the answer should look	"You are a workforce analyst. Calculate how many agents we need for 1,800 emails a day at 9 minutes each. Show the steps in a table."
CREATE	Character · Request · Examples · Adjustments and constraints · Types of output · Evaluation (how to judge a good answer)	Used for charters, FMEAs, X-matrices and change plans, where context and quality criteria matter.

Patterns worth knowing

- **Flipped interaction:** "Ask me questions one at a time until you have enough to...". Best when you don't know all the steps.
- **Iterative refinement:** start broad, then add context and constraints in the next prompts.
- **Prompt chaining:** break a big task into a sequence of small prompts.
- **Check the math:** "Show every step and the spreadsheet formula so I can verify it."

When the answer is weak

- Add detail and context; remove anything irrelevant.
- Use a formula (RTF or CREATE) and ask for one thing at a time.
- Remove conflicting requests.
- Ask it to cite the module of the study companion it used.
- If it refuses or goes off track, ask it to explain why and suggest an alternative.

The RTF and CREATE formulas and the patterns above follow PMI's "Talking to AI: Prompt Engineering for Project Managers" (2024), adapted here to Lean Six Sigma in service operations. See the sources appendix.

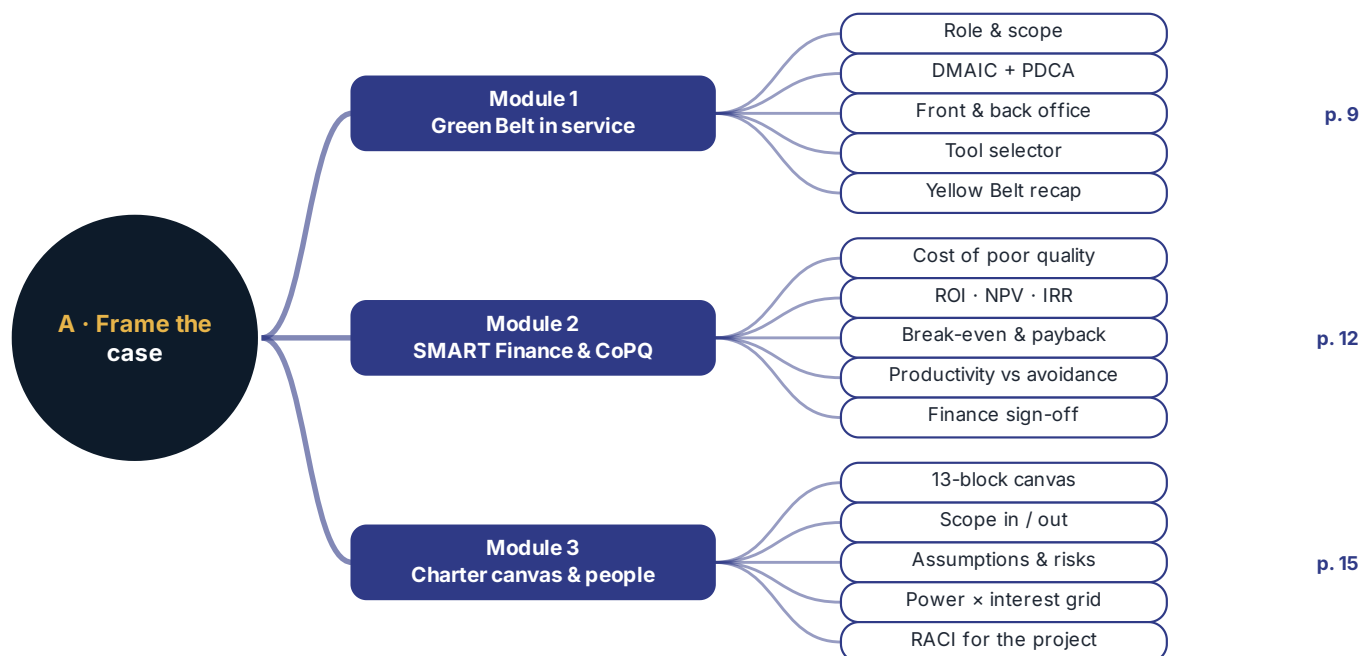


PART A

Frame the case

The Green Belt role, the business case in money (cost of poor quality, ROI, NPV) and a charter canvas that gets people on board.

PART A · MODULES 1-3





PART A · MODULE 1

The Green Belt in service operations

What changes when you move from spotting problems to leading the projects that fix them.

WHERE YOU ARE · PART A



IN PLAIN WORDS

A Green Belt leads improvement projects for a department or a client program. This module sets the role and shows how front-office and back-office work differ.

1.1 From Yellow to Green

A Yellow Belt reads data correctly and finds real problems. A **Green Belt** leads the project that solves one. That means owning the business case, the data plan, the analysis, the pilot and the handover, usually part-time alongside a day job, with a Black Belt as coach.

Yellow Belt recap	What to remember
Four voices	Customer, business, process and employee; Kano types decide whether to maximize or hold at the knee
Charts	Lines for time, bars to compare; 12 rules; read R^2 with care (the author's rule of thumb: about 0.5 or more before projecting a trend); scatter plots start from a hypothesis
Statistics	Averages mislead; weight by volume; SD, CV, 68–95–99.7
Variation	Histogram + CV + target decide process vs. outlier problem
Capability	Z to the nearest limit; +1.5 convention; DPMO for counted defects
Causes	Pareto, SIPOC, flowcharts, swim lanes, CTQ tree, 5 Whys, fishbone
Method	DMAIC with loops back; "just do it" when the cause is known; one-page charter



1.2 Two operating models, one method

FRONT OFFICE (CONTACT CENTER)

Work arrives randomly and the customer waits *on the line*. Capacity must be in place **before** demand arrives. Key measures: service level, abandon, handle time, first-contact resolution, CSAT.

BACK OFFICE (SHARED SERVICES)

Work waits *in a queue*: invoices, HR cases, tickets. It can be scheduled, batched and leveled. Key measures: cycle time, backlog age, first-time-right, cost per transaction, compliance.

Most Green Belt tools apply to both, but they are used differently. Heijunka, Kanban and SMED are natural in the back office. Erlang staffing and real-time management are natural in the front office. This manual shows both sides for each tool.

1.3 DMAIC and PDCA together

DMAIC is the project routine for problems whose cause is unknown. **PDCA** (Plan-Do-Check-Act) is the everyday improvement cycle that keeps gains alive. Green Belts use DMAIC for the project and hand over a PDCA rhythm (daily huddles, weekly reviews) to the process owner at the end.

DMAIC phase	Green Belt tools in this manual
Define	SMART Finance and CoPQ (2), charter canvas and stakeholder map (3), SIPOC and value stream (4)
Measure	Flow and capacity (5), data and sampling (7), measurement systems (8), distributions (9), capability (10)
Analyze	Value stream waste (4), graphical analysis (11), hypothesis tests (12), FMEA (13)
Improve	Pull, level and switch (6), mistake-proofing and experiments (14)
Control	Control charts and plan (15), daily management and benefits tracking (16)

WATCH OUT

Many manufacturing examples assume machines, parts and stable cycle times. In service, the "machine" is usually a person using a system, the "part" is a conversation or a case, and demand swings by the hour. Every tool here is translated with that in mind, and the tool selector in Appendix B shows when *not* to use each one.

TRY IT · 1.1

List three problems in your area. For each, decide whether it needs a just-do-it action, a PDCA/A3 or a DMAIC project, and write one sentence explaining why.

AI PROMPT TIP · RTF

Role: You are a Lean Six Sigma Green Belt coach.

Task: For these three problems in my area [describe them, no client names], say whether each needs a just-do-it action, a PDCA/A3 or a DMAIC project, and why.

Format: a table with problem · approach · reason · first step.



MODULE 1 TAKEAWAYS

- Green Belts lead projects: business case, data, analysis, pilot and handover.
- The front office manages waiting customers; the back office manages waiting work. Same method, different levers.
- DMAIC solves the problem; PDCA sustains it.

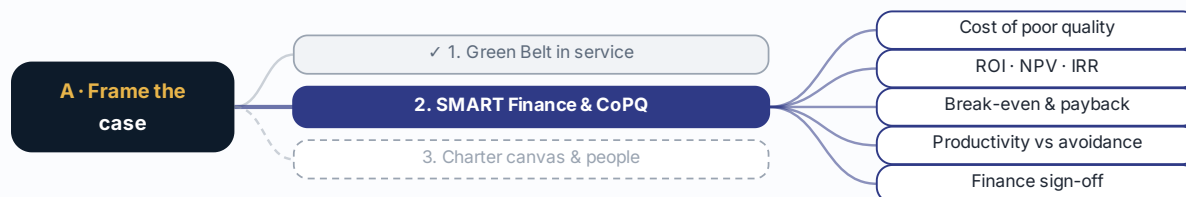


PART A · MODULE 2

SMART Finance and the cost of poor quality

If you can't say it in money, leadership will hear it as opinion.

WHERE YOU ARE · PART A



IN PLAIN WORDS

Leadership listens to money. You'll size the cost of poor quality, express a project's benefit with ROI, NPV and payback, and have Finance validate it.

2.1 Translate operations into leadership's language

Strategy flows down from leadership as objectives. Results must flow **back up** in the same language. SMART Finance means expressing every project's benefit as a financial or strategic indicator a director recognizes: cost, revenue, risk or customer retention.

2.2 The cost of poor quality (CoPQ)

CoPQ is the money a process loses because it doesn't work right the first time. In services it is mostly invisible, because it looks like "normal work".

CoPQ bucket	Contact center	Shared services
Internal failure	Repeat contacts, transfers, escalations, rework of cases	Invoice exceptions, re-keyed HR changes, reversed payments
External failure	Complaints, credits and goodwill payments, churn, contract penalties	Late-payment fees, lost early-payment discounts, payroll errors reaching employees
Appraisal	Quality monitoring, double checks, audits	Second approvals, reconciliations, manual audits
Prevention	Training, knowledge base, better tools	Supplier onboarding, data standards, system validations

CASE · SIZING COPQ AT CORDAVELLE

Billing repeat contacts: about 1,700 a month (Yellow Belt, Module 9) × USD 4.00 fully loaded cost per contact = **USD 6,800 a month**, or about USD 81,600 a year, in internal failure alone. Add the client's contractual CSAT bonus at risk (external failure) and the case becomes a leadership priority.



2.3 Financial indicators

Indicator	Meaning	Excel
ROI	$(\text{Total benefit} - \text{cost}) \div \text{cost}$	$= (B - C) / C$
NPV	Value today of all future cash flows, discounted at the company's rate, minus the investment. Must be positive.	$= \text{NPV}(\text{rate}, \text{flows}) + \text{initial}$
IRR	The discount rate at which NPV = 0. Compare with the company's hurdle rate.	$= \text{IRR}(\text{all flows})$
Payback / break-even	Time until cumulative benefits repay the investment	Cumulative sum of flows
Opportunity cost	The value of the best alternative given up	—

CASE · PELLAVIX PEOPLE SERVICES: ONBOARDING AUTOMATION

Investment USD 60,000 (integration between the applicant-tracking and HR systems). Benefit USD 30,000 a year for three years (fewer manual keying hours and day-one access failures). Company rate 10%.

- ROI over 3 years = $(90,000 - 60,000) \div 60,000 = \mathbf{50\%}$
- NPV = $-60,000 + 30,000/1.1 + 30,000/1.1^2 + 30,000/1.1^3 = \mathbf{USD\ 14,606}$ (positive → value-creating)
- IRR $\approx \mathbf{23.4\%}$ (above the 10% hurdle)
- Payback = **2 years**

2.4 Classifying benefits

Type	Definition	Example
Productivity (hard savings)	Recurring cost removed from the budget	2 FTE fewer needed on the billing line
Cost savings (one-off)	A one-time saving that doesn't change the process	Renegotiated licence renewal
Cost avoidance	Cost that would have occurred but was prevented	Contract penalty avoided; late-payment fees avoided
Strategic / soft	Value without a direct budget effect	Higher CSAT, better employee experience, lower risk

WATCH OUT

"Freed capacity" is not a hard saving until someone decides what to do with it: reduce hiring, absorb growth, or move people to new work. Agree the rule with Finance **before** the project starts (Module 16).

TRY IT · 2.1

Brinmoor loses early-payment discounts of 2% on invoices paid late. Last quarter USD 1.2 million of eligible invoices were paid after the discount window. What is the quarterly CoPQ, and which bucket is



it?

AI PROMPT TIP · RTF + CHECK THE MATH

Role: You are the Finance partner of a shared-services center.

Task: Brinmoor lost 2% early-payment discounts on USD 1.2 million of invoices paid late last quarter. Calculate the quarterly and annual cost of poor quality and classify it (internal failure, external failure, appraisal or prevention).

Format: show the calculation line by line, then the classification with a one-sentence reason.

MODULE 2 TAKEAWAYS

- Speak finance: CoPQ, ROI, NPV, IRR, payback.
- CoPQ in services hides in repeat work, exceptions, checks and credits.
- Classify benefits honestly: productivity, one-off savings, avoidance, strategic.

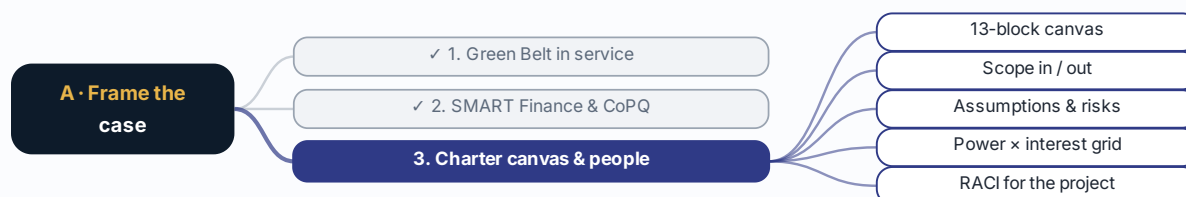


PART A · MODULE 3

The charter canvas and the people side

A one-page canvas that everyone can see and change, plus a plan for the people who can make or break the project.

WHERE YOU ARE · PART A



IN PLAIN WORDS

A one-page charter canvas gets everyone aligned; a stakeholder map and a RACI make sure the right people support the project.

3.1 The 13-block charter canvas

The Yellow Belt charter (six sections) becomes a visual canvas at Green Belt level. Fill it with the team on a wall or a digital whiteboard, starting from the **purpose**.

#	Block	What goes in
1	Purpose / justification	Why the project matters to the strategy and the customer
2	Description	What the project will deliver and the work involved
3	Measurable objectives	Attribute + unit + value, e.g. "repeat contacts ≤ 12% by 30 Nov"
4	Expected benefits	Classified as in Module 2
5	High-level requirements	Standards, regulations, client-contract clauses the result must meet
6	Exclusions	What is explicitly out of scope
7	Milestones	DMAIC tollgates with dates
8	Budget	Ceiling and main cost items
9	Assumptions	Things taken as true; each must be validated
10	Constraints	Limits: contract, systems freeze, peak season
11	Risks	Threats and opportunities, with a response
12	Stakeholders	Who is affected or can influence (3.2)
13	Approval requirements	Who signs off, and on what evidence



Responding to risks

Threats: avoid (remove the cause), mitigate (reduce probability or impact), transfer (to a supplier or insurance), accept (with a contingency).

Opportunities: exploit (make it happen), enhance (raise its probability), share (with a partner), accept.

3.2 Stakeholders: power × interest

	Low interest	High interest
High power	Keep satisfied: brief, concise updates; no surprises	Manage closely: involve in decisions; regular one-to-ones
Low power	Monitor: general communication	Keep informed: show progress; use them as champions

For each stakeholder, record the current stance (supporter, neutral, skeptic, resistant) and the stance you need by the Improve phase. The gap is your engagement plan.

3.3 RACI for the project

A RACI matrix lists the project's key activities and marks, for each role: **R**esponsible (does the work), **A**ccountable (one person who decides), **C**onsulted (before) and **I**nformed (after). Rule: exactly one A per activity.

Activity	Green Belt	Process owner	WFM	Client	Finance
Data collection plan	R/A	C	C	I	
Pilot design	R	A	C	C	
Benefits validation	R	C		I	A
Control plan handover	R	A	C	I	

TRY IT · 3.1

For a project to cut Pellavix onboarding lead time, place these stakeholders on the power × interest grid: HR director, IT provisioning manager, new-hire managers, the HR transactions team, the works council.

AI PROMPT TIP · RTF

Role: You are a change-management advisor.

Task: Place these stakeholders of a project to cut Pellavix onboarding lead time on a power × interest grid: HR director, IT provisioning manager, new-hire managers, HR transactions team, works council.

Format: a 2 × 2 table, then one engagement action per stakeholder.



MODULE 3 TAKEAWAYS

- The 13-block canvas makes the project visible and editable. Start from purpose.
- Validate assumptions; plan responses to both threats and opportunities.
- Map stakeholders by power and interest, and close the stance gap on purpose.
- One A per activity in the RACI.

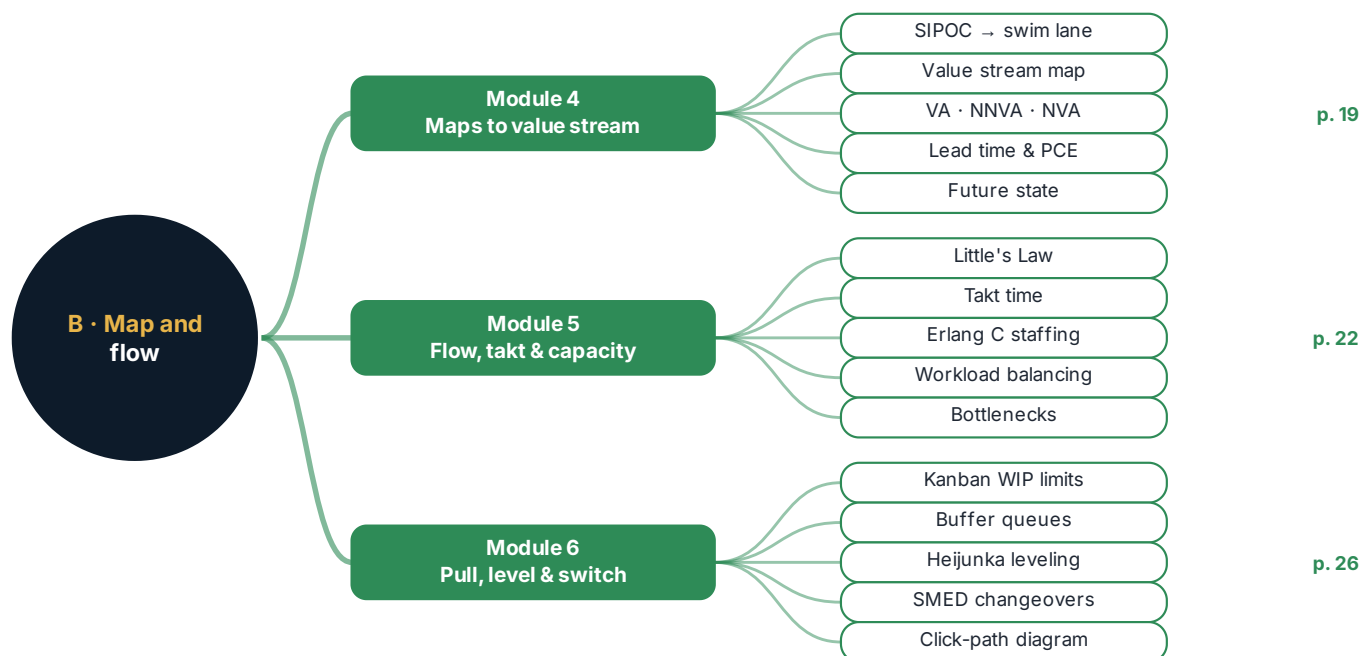


PART B

Map and flow

Value streams, queues and staffing, and the pull, leveling and fast-changeover tools that make service work flow.

PART B · MODULES 4-6





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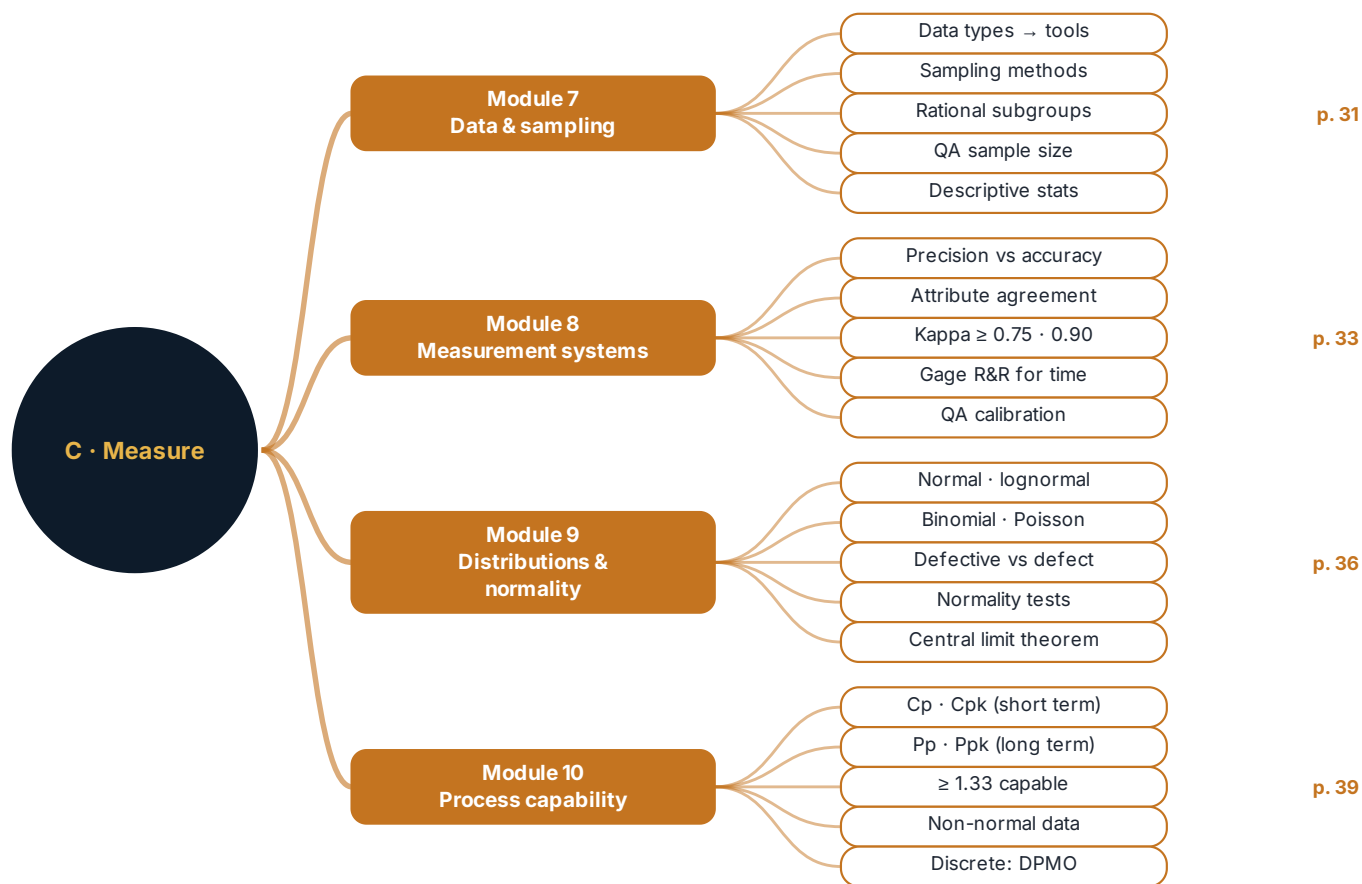


PART C

Measure

Data you can trust: sampling, measurement systems for human judgments, distributions and capability.

PART C · MODULES 7-10





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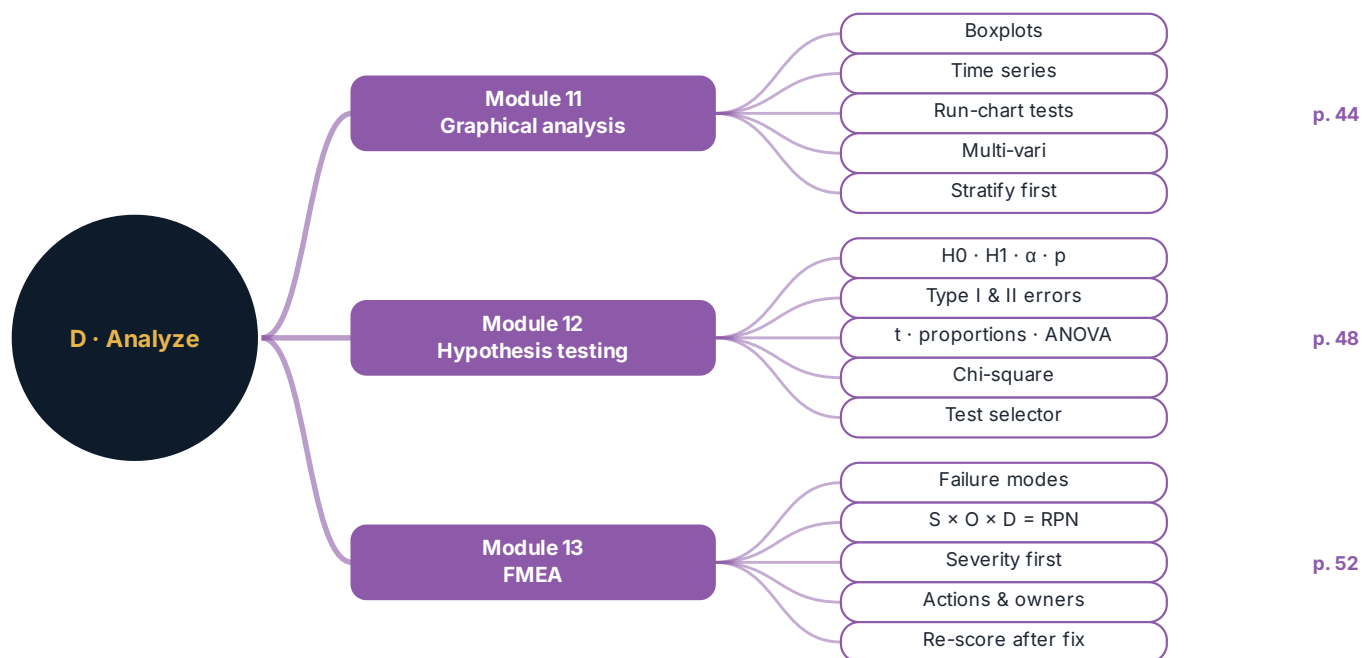


PART D

Analyze

Proving causes with the right charts, hypothesis tests and FMEA.

PART D · MODULES 11-13





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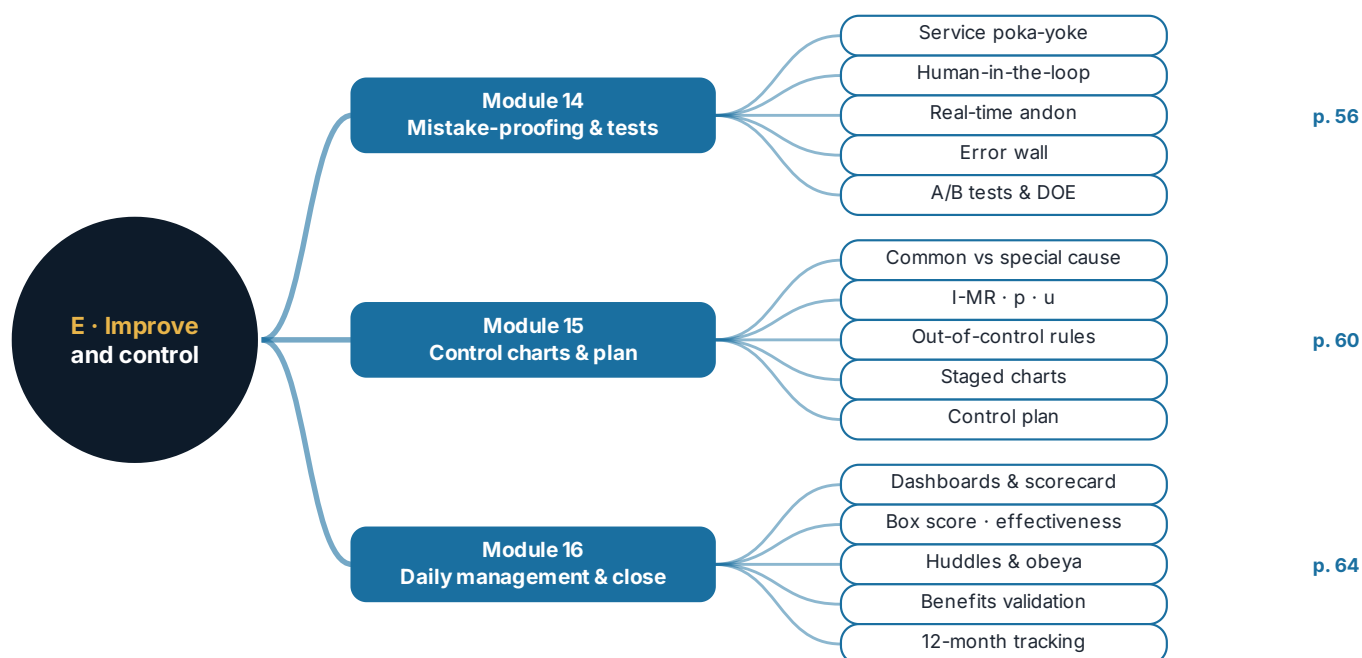


PART E

Improve and control

Mistake-proofing, human-in-the-loop automation, experiments, control charts and daily management to hold the gain.

PART E · MODULES 14–16





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