

Project Procurement and Supply Chain

Prepared by Dr. Tarek Mohamed

PMG 433

Lecture 10



The background features a series of vertical panels with rounded ends. The first panel shows hands typing on a laptop. The second panel has a graduation cap icon. The third panel has a play button icon. The fourth panel has a target icon. The fifth panel has an open book icon. The sixth panel has a magnifying glass icon. The seventh panel has a bar chart icon. The eighth panel has a group of people icon.

Project changes: Sources, Impacts, Mitigation, Pricing, Litigation, and Excellence & Key Trends in Project Management.

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Course Agenda

Chapter

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1. Understand the meaning and importance of project change.
 2. Describe how changes may impact the project.
 3. Explaining the best ways of managing contracts.
 4. Describe the best ways of managing the project.
 5. Discuss how to manage the contractor-customer relationship.
 6. Key Trends in Project Management

Change

- **Change** is a necessary fact of project life.
- Projects are not just about meeting contractual requirements; they are about achieving the outcomes the end users need.
- In a world in which markets shift, technology advances, and requirements evolve, projects must be able to accommodate all of these types of changes.
- The result can be a more capable product that better meets the users' needs.
- Changes handled well generate long-term business relationships of trust and understanding; handled poorly, however, they can spiral into overruns and disputes.

Changes may come in many forms, such as:

- Design changes
- Work-scope changes
- Late receipt of important technical information
- Excessive delays in design review and approval
- Diversion of key management and technical resources
- Unplanned site conditions
- Inadequately defined specifications or design “baseline”
- Changes in standards and regulations
- Late or inadequate subcontractor performance
- Schedule changes or acceleration
- Superior knowledge
- Technology advances

How Changes Impact a Project

- Logically, analytically, contractually, procedurally, and practically, there are two fundamental categories of change impacts on projects:

Direct impacts and **Disruption impacts**.

- Each category may have many alternate labels (direct/hard-core/primary disruption/ ripple/productivity loss/knock-on/impact/cumulative . .).
- Basically, however, the practical distinction is this: The visible cost of directly implementing or accommodating a change is **direct impact**; the change's impact on the cost of executing unchanged work (or, indeed, even other changed work) is **disruption**.

Direct Impacts

- **The direct impact** of any given change is likely to have multiple dimensions.
- All impacts need to be translated eventually into one measure, of course: **cost**.
- But there are three dimensions that are helpful in achieving that translation.
- **Added Expenditures/Scope**. This dimension of direct impact can be the most straightforward to document. “Build three, not two.” “Buy another generator.” “We need to install another two hundred feet of piping.”
- The measures may be dollars of material and/or additional hours (and dollars) of labor.

Delays

- **Delays.** Two types of delay can directly impact a project. Some sources of delay can be demonstrated to extend the period of performance on the project. For these delays there are accepted categories and formulas for added costs incurred.
- **Other sources** of delay may have little or no direct impact on schedules and cost but may still have disruptive consequences.
- **Examples** could include late material delivery or delayed access to testing facilities. Even without critical path-delaying impact on the whole project, such conditions should be documented, as they can cause staff productivity impact (disruption).

Design Uncertainty

- **Design Uncertainty.**
- Another dimension of direct impact of changes is design uncertainty.
- Although not a direct cost source, one of the best early indicators of disruption impact is the degree of the design package affected by changes.
- The origin of this impact may be explicit design changes, or merely lack of resolution of needed design decisions (such as through delayed design change approval).
- Monitoring the percentage of the design so impacted, and the duration of the impact, is valuable.

Disruption is the change-induced additional cost of performing work not directly changed. Hence, it is necessarily the added cost (beyond what would have been required otherwise) from lowered productivity or increased rework on the unchanged work, as traceably caused by the change(s).

The Challenges of Disruption. disruption is the most difficult and most abused aspect of contractual change pricing. It is precisely because it is the most difficult that it has been the most abused: some contractors use it as a blanket to hide their own problems and cover all cost overruns with “total cost” claims to customer; some customers have taken equally outrageous positions of denying the very existence of disruption and refusing any consideration or compensation for it.

The Top Ten Causes of Project Productivity Loss

Changing work sequence. Workarounds are frequently necessary, especially when design changes are required and when tight schedules force moving ahead even when necessary, information is unavailable, and tasks must be performed out of their ideal or planned sequence.

- **Skill dilution.** Higher staffing in a tight labor market usually means new, less experienced hires are brought into the program.
- **Supervision dilution.** Higher staffing levels, especially with less experienced personnel, can divert supervisors and dilute their effectiveness.

The Top Ten Causes of Project Productivity Loss

Overtime/second shifts. Overtime or added shifts are frequently used to accelerate work progress; overtime is among the most researched effects on productivity.

- **Rework.** Productivity and rework creation suffer when downstream work products build off of flawed earlier work.
- **Congestion/crowding.** Especially when work is done in constrained spaces, higher staffing levels will hurt work productivity.
- **Late/changing engineering.** Changes or delays in the design will slow work progress and can cause rip-outs in build efforts.

The Top Ten Causes of Project Productivity Loss

Morale.

When program problems mount, the morale and productivity of the workforce may suffer and cause increases in absenteeism and staff turnover.

- **Tools/equipment/materials.**

When necessary, prerequisites or tools are late, the affected workforce suffers reduced productivity.

- **Schedule pressure.**

If the program schedule begins to look difficult to achieve, pressure to regain schedule may cause a “haste makes waste” effect.

While output may seem to be accelerated, it is frequently at the cost of increased rework.

When It All Goes Wrong: Disputes

- For both customer and contractor (or subcontractor), a contract dispute or claim can be the most management-distracting, relationship-damaging, costly process of their careers.
- Whether ultimately resolved via negotiations, mediation, arbitration, or trial before a board or court of any jurisdiction, the contract dispute over unresolved costs of project change impacts can consume enormous staff and executive time, decimate customer contractor goodwill, and cost millions of dollars.

When It All Goes Wrong: Disputes

- The existence of and toll taken by such disputes is testament to the value of timely resolution of change impact costs during a project.
- When agreement on those costs cannot be resolved by routine processes, at least one party may choose to initiate a claim process.
- Processes and venues for such claims will have been spelled out in the contract terms.
- Regardless of process or venue, the burden of proof is essentially the same: **(1)** the contractor must establish entitlement to recover for those “changes”; **(2)** causation of impact must be established; and **(3)** the full quantum of that impact must be demonstrated

When It All Goes Wrong: Disputes

Very much gone are the days of (successful) total cost claims between:

- (A) **Universal disfavor among courts** and
- (B) **The use or threat of use**, contractor claims that overreach (by attempting to recover all costs regardless of demonstrated causation) are likely doomed to failure. Indeed, any contractor claim that fails to provide adequate proof of liability, causation, and damage is so doomed.

When It All Goes Wrong: Disputes

The characteristics of an analysis that are needed for a strong case are that it:

- **Explain** variations in productivity and rework.
- **Assess** what would have happened under alternate conditions.
- **Describe** the causation that ties effect to precipitating event(s).
- **Account** for and explain cumulative impact of many individual claimed events.
- **Explain** why and how productivity would have been affected.

When It All Goes Wrong: Disputes

- **Account** for other concurrent events that influenced project performance;
 - **Permit** validation; and
 - **Be** testable and auditable.
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- Given the extreme challenge of explaining and quantifying the disruption elements, it is no wonder that many claims involving disruption are resolved at no more than 30 to 40 percent of the claimed value.
 - This may be less a measure of truth and accuracy than an indicator of the difficulty of explaining and quantifying such claims.

Management of Change Process: Excellent Practices

- With the many adverse impacts that can occur as consequences of change, it is crucial that the management of change be a high-priority aspect of managing projects.
- Actual practice, however, varies widely.
- Some project managers see change as something to be avoided.
- Others plan and behave as though change simply will not happen to them. Still others view change as an opportunity, a chance to recover on bidding mistakes.
- The best approach is to accept that change is normal and to be expected. On all but the most standard cookiecutter projects, changes will happen.

Management of Change Process: Excellent Practices

- The key is not to avoid all changes but to anticipate them, be prepared for them, and react to them properly, with trained staff aided by clear guidelines and processes and systems.
- Different researches was conducted by interviewed dozens of top executives, project managers, attorneys, and consultants in the construction, software, and defense industries. The many interviews we conducted highlighted that change management practices vary significantly, as do the resulting project outcomes.
- Further, when it comes to change management, the experience of the manager is not a good predictor of success; success requires having the right processes in place and following them.

Management of Change Process: Excellent Practices

- The process areas that are keys to success in handling change are as follows:
- **Managing the contract**
- **Managing the project**
- **Managing the contractor-customer relationship**

Managing the Contract

- **Change planning** is critical during the drafting of the contract documents. Contractor and customer should have an open discussion about change, including how much change is reasonable to expect and how, together, changes will be handled.
- **Central Contract Review.**
- One key element to successful management of contracts is to have central contract review.
- Firms that do a good job at managing project changes (in terms of pricing, mitigating impacts, recovering damages, and avoiding disputes) have a strong central coordination, if not control, of the process from beginning to end.

Managing the Contract

- Starting from before the project begins, all contracts should be reviewed centrally by the legal department. While it is fine to craft custom change clauses as needed, central review ensures compliance with key principles (e.g., reservation of rights, consequential damages, damage-delay clauses).
- Equally important is knowing when to walk away. Thorough contract review enables parties to make informed decisions regarding the acceptability of a contract and the risks it would bring.

Managing the Contract

- As part of this whole process, the legal department should develop a standard checklist of all the elements that should appear in the contract.
- Central review will uncover deviations from the norm and enable informed decision about variances. Indeed, the contractor should assign an attorney to each contract and have that attorney support the contract beginning to end.
- This attorney should be responsible for all the legal aspects of the contract and stay involved throughout, ensuring familiarity with the project when issues arise.
- In this way, the attorney can serve as an ongoing resource to the project management team, who should themselves be familiar with the contract terms and conditions.

Managing the Contract

- **Specify Planned Conditions.** One the first challenges in dealing with change is getting both sides to agree whether a change has occurred. For this reason, it is important to specify clearly in the contract what the planned conditions and dependencies are .
- With the baseline conditions clearly specified, the emergence of changed conditions is easier to identify.
- **Consider in Advance How to Deal with Disputes.** There are a variety of constructive approaches to resolving disagreements proactively. If both sides can agree in advance on a process with which they are comfortable, much of the tension surrounding change can be alleviated.

- **Provide Training.**
- Companies that are successful in managing changes make sure the team understands the project and how to identify change.
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- They publish explicit guidelines and standard processes and teach them throughout the company.
- They train the management team in documentation, letter writing, and handling constructive changes.
- They provide basic legal education for the project management team.

- **Exercise Discipline.**
- Most of the managers and attorneys interviewed emphasized the importance of discipline. Central standards and guidelines may sound bureaucratic and, frankly, boring, but they are helpful in ensuring projects run smoothly.
- As one executive noted, “new ideas are not needed as much as enforcement of basic ‘blocking and tackling’ around project change”
- Develop a standard set of processes for projects, train people in the processes, and enforce guidelines to ensure the processes are actually followed.
- An important element to these processes is to make compliance with the processes as easy as possible. Forms for logging changes, for example, while covering the essentials, should require as little input as possible.

Managing the Project

- Before the project begins, have a transition session to impart key information from the proposal team to the project team.
- The proposal manager and project manager should review together all the assumptions used in generating the proposal, including a review of project risks and early warning signs that those risks are developing.
- Best of all is for the project manager to have been involved in the proposal effort, so the person responsible for executing the project will have been involved in defining it.

Managing the Project

- Every piece of paper exchanged between customer and contractor should be reviewed for change content. However, even a thorough review of paperwork may miss many changes on a project. Therefore, it is important to monitor constantly for change. If a contractor has confidence in the estimating process employed, then the very fact of overruns in various cost cells might signal that a change occurred.
- The overrun implies either that there was a misestimation or that something changed—perhaps there were verbal instructions from the customer that never made it into writing, or perhaps the specifications were too vague.
- Investigate these overruns. Whatever their source, whether changes initiated by the customer, misestimation, or unexpected productivity losses, the contractor should ensure proper diagnosis

Find and Process Changes Promptly.

- Contractors need to provide supervisors in the field the right incentive to identify changes. One successful approach is to create a work task category such as “Pending Items,” items that have been identified and for which the customer will be or has been notified, but which have not yet been approved.
- In earned-value progress reporting, supervisors would get credit for these items, such that their performance measures are not penalized as a result of changes.
- Contractors should provide the customer with timely notice and then ensure they do not execute any work that is neither authorized as a change nor pending.

Managing the Project

- Assign dedicated personnel for handling the change process. Particularly on those jobs with tight budgets (i.e., those most likely to end up with disputes), there is a tendency to cut back on overhead, but it is exactly these projects that are most likely to end up overrunning and have disputes.
- In the event of a dispute, daily reporting, schedule updating, and disciplined documentation become especially important and can, in fact, promote the resolution of disputes.

To increase the likelihood that both sides are working with the same facts, the following are helpful practices.

- Prepare daily time and material sheets and submit reports to the customer every day.
- Daily reporting accelerates communication and ensures all are well informed on project status.
- Log time and cost for every change in a separate cost code. Contemporaneous tracking of costs is far better than a re-creation done later.
- While even real-time reporting is certain to miss some of the impacts of change, it at least provides a more complete picture of the direct costs.

Managing the Project

- Document efficiency losses (e.g., when workers are waiting on material, log their time idle).
- Comment on inefficiencies at job meetings, and record these in meeting minutes.
- Contemporaneous tracking of productivity problems will ensure that everyone is aware of all relevant problems (perhaps enabling some mitigation ideas), and it provides a good resource for computing disruption.

Managing the Project

- Take pictures of the job site and date them. Photographs (or videos) often can relay the story far more clearly than written documentation. For example, a photograph showing workers crowded into a site is better documentation than a report including comments that congestion has been an issue.
- The contractor should document the customer's performance as well as their own. It is not only the contractor whose performance can drive cost and schedule. Delayed approvals from a customer or late information can impact contractor performance and should be documented and included in reports to the customer

Managing the Contractor-Customer Relationship

- **Communicate Effectively.** A key to success is open, honest, and direct communication between the customer and contractor. It is important for the contractor to invite active customer involvement early in the project.
- Some contractors, for example, require an open exchange with the customer before the project starts to discuss priorities and processes, including the handling of changes.
- Reports from contractor to customer should be regular and frequent, include both the good and the bad, and be complete and fair in reporting the true status of the project.
- It is important that customers be confident that they are hearing about all issues and that the contractor will alert them quickly and be ready to discuss any problem that might arise.

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Managing the Contractor-Customer Relationship

■ Price Completely

- When changes are small and uncomplicated, it is usually straightforward to develop an accurate assessment of the total cost of a change.
- When changes are numerous, large, and/ or complex, it is much more difficult.
- While it is important to resolve issues as quickly as possible, it is wiser to provide an informed estimate than to present a number that may increase dramatically later.

Managing the Contractor-Customer Relationship

- Know the project conditions and understand how the change fits in before trying to estimate the impact.
- It is essential to understand the impacted site, as it is in this environment in which the change will take place
- Is labor already crowded into the site where the change will add more people? Has the affected work already started? Are people working in a comfortable environment or are they welding in midsummer heat?
- When providing an estimate, contractors must be realistic, practical, and not overstate the costs.
- Estimate as much of the costs as possible, minimizing the number of reservations. In the estimate, consider additional rework that may occur, as well as any anticipated lost productivity

The Importance of Getting it Right

- Project changes are inevitable. They are essential in order to improve products, adopt new technologies, adapt to market conditions, and accommodate changed or unexpected circumstances.
- If we as project managers, executives, and customers know to expect changes, we must learn to manage them far better. We need to execute the basic “blocking and tackling” of change planning and monitoring.

The Importance of Getting it Right

- We need to evaluate alternatives and trade-offs and review them openly between customer and contractor.
- We need to anticipate and communicate more completely and candidly the likelihood and nature of disruption impacts, and thus the ultimate cost effects on the project.
- Companies who do so see substantial performance improvement.
- The failure to do so results in project overruns and failures, damaged customer-contractor relations, resource-consuming disputes, ruined careers, and lost profits and shareholder value.

1. Widespread Adoption of AI & Automation

- Artificial intelligence is now becoming a core tool in project management not just a “nice-to-have.”
- AI-driven tools can automate routine tasks such as scheduling, resource allocation, progress tracking, reporting, and even risk detection.
- Predictive analytics help forecast delays, resource bottlenecks, or cost overruns — giving project managers a chance to intervene before issues escalate.
- This automation and AI-assisted decision-making frees up more time for strategic tasks, innovation, and value-added leadership rather than repetitive admin work.

2. Rise of Hybrid Methodologies (Agile + Traditional + Custom)

Rather than sticking strictly to classic Waterfall or strictly Agile, many teams now adopt “hybrid” frameworks — blending structure and predictability with flexibility and rapid iteration.

1. Hybrid approaches allow tailoring based on project type — some parts follow Agile (flexible, iterative), other parts follow more traditional planning — useful especially in larger or more regulated projects.
2. This adaptability helps organizations respond to changing requirements, uncertainty, or evolving stakeholder needs more effectively.

3. Remote & Hybrid Work — and Distributed Teams

Remote or hybrid team setups have become a permanent fixture. Managers now often handle teams distributed across locations and time zones.

This drives the need for strong digital collaboration tools, real-time (or asynchronous) communication, and virtual leadership skills.

Project management tools increasingly support cloud-based workflows, shared dashboards, and integrations making coordination easier regardless of physical location.

4. Data-Driven Decision Making & Portfolio Management

- Project decisions are increasingly based on data — real-time dashboards, analytics, and performance metrics (not just gut feeling).
- Organizations are paying more attention to project portfolio management (PPM): managing multiple projects as a portfolio, optimizing resource allocation, aligning with strategic goals, and managing risks across projects.
- Emphasis is shifting from vanity metrics (e.g. number of tasks done) to outcome-based metrics — ROI, on-time delivery, client satisfaction, budget adherence.

5. Expansion of Agile Beyond Software — and in New Contexts

- Agile methodologies, once mostly used in software development, are now spreading to other domains: marketing teams, creative agencies, even non-tech businesses.
- The flexibility and iterative delivery model of Agile make it attractive for any work that benefits from quick feedback loops, evolving requirements, and collaboration.
- As a result, project-management culture is shifting — more adaptive planning, continuous delivery, frequent stakeholder feedback, and incremental value delivery.

6. Emphasis on Collaboration, Communication & Stakeholder Engagement

- With distributed teams and hybrid work, collaboration tools, transparent communication, and stakeholder engagement become critical for success.
- As projects and stakeholders grow more diverse, cross-functional collaboration (across departments, disciplines) is increasingly important.
- Virtual collaboration — real-time dashboards, remote updates, asynchronous progress tracking — is now standard rather than exceptional.

What This Means for Project Managers & Organizations

Flexibility is vital: Rigid methods (only Waterfall or only Agile) are becoming less optimal. Hybrid approaches offer adaptability.

Invest in tools and skills: AI-enabled PM tools, cloud-based collaboration platforms, data dashboards — and human skills like communication, leadership, adaptability.

Think strategically: Projects are less about checklists and more about outcomes, value delivery, alignment with business goals, and stakeholder satisfaction.

Be ready for remote & distributed operations: Virtual teamwork, asynchronous communication, global teams — manage for trust, clarity, accountability.

Embrace continuous learning and change: The pace of change in technology, methods, organizational expectations is faster — success demands ongoing learning and agility.

Summary of Learning Objectives

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1. Understand the meaning and importance of project change.
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Thank You