Project: complex, non-routine, one-time effort limited by time, budget, resources, perf specs designed to meet customer needs
Project characteristics: established objective, defined life span with beginning & end, requires participation across the org, typically involves doing sth never done before, has specific time, cost, perf reqs
Project life cycle:
Defining: goals, specs, tasks, responsibilities
Planning: schedules, budgets, resources, risks, staffing
Executing: status reports, changes, quality, forecasts
Closing: train customer, transfer docs, release resources, evaluation, lessons learned
Factors leading to increased use of PM: compression of product life cycle, knowledge explosion, triple bottom line (planet, people, profit), corporate downsizing, increased customer focus, small projects represent big problems
Project Manager: manages temporary, non-repetitive activities, frequently acts independently of formal org, marshals resources for project, linked directly to customer interface, provides direction, coordination & integration to the project team, responsible for performance & success of the project, must induce right people at right time to address the right issues and make right decisions
PM Technical Aspects: scope, WBS, schedules, resource allocation, baseline budgets, status reports
PM Sociocultural Aspects: leadership, problem solving, teamwork, negotiation, politics, customer expectations
Integrated management of projects: strategic alignment, portfolio management, PM, with org culture env wrapped around
Integration of projects with org strategy: use of selection criteria to ensure strategic alignment and project priorities (effective use of org resources); selection process that is systematic, open, consistent & balanced; all selected projects become part of portfolio that balances risk for org; portfolio management ensures only most valuable projects approved & managed across entire org; value of project not only ROI but also strategic fit & best use of org resources
Integrative PM approach benefits: provide senior management with overview of all PM activities, big picure of how org resources used, risk assessment of project portfolio, rough metric of org's improvement in managing projects relative to others in industry, linkages of senior management with actual project execution management
Portfolio Management Functions: oversee project selection, monitor aggregate resource levels & skills, encourage use of best practices, balance projects in portfolio in order to represent risk level appropriate to the organisation, improve communication among all stakeholders, create total ord perspective that goes beyond silo thinking, improve overall management of projects over time
Program: a series of coordinated, related, multiple projects that continue over an extended time and are intended to achieve a goal
Traditional PM: focus on thorough, upfront planning of entire project, requires high degree of predictability to be effective
Agile: relies on incremental, iterative dev cycles to complete less predictable projects, ideal for exploratory projects in which requirements need to be discovered and new tech tested (uncertain ablut how long, what is required, allows change in reqs), focus on active collaboration between project tem & customer reps

Traditional	Agile
Design up front	Continuous design
Fixed scope	Flexible
Deliverables	Features/reqs
Freeze design as early as possible	as late as possible
Low uncertainty	high
Avoid change	embrace
Low customer interaction	high
Conventional project teams	self-organised

Agile Details: use iterations to develop workable product that satisfies the customer and other key stakeholders, stakeholders & customers review progress & re-evaluate priorities to ensure alignment with customer needs & company goals, adjustments are made & a different iterative cycle begins that subsumes the work of the previous iterations & adds new capabilities to the evolving product
Agile Advantages: useful in developing critical breakthrough tech or defining essential features; continuous integration, verification & validation of the evolving product; frequent demonstration of progress to increase likelihood that end product will satisfy customer needs; early detection of defects & problems
Agile Limitations: does not satisfy top management's need for budget, scope & schedule control; self-organisation & close collaboration principles can be incompatible with corporate cultures; appears to work best on small project with 5–9 people, requires active customer involvement & cooperation
Agile Principles: focus on customer value, iterative & incremental delivery, experimentation & adaptation, self-organisation, continuous improvement
Project uncertainty dimensions: scope & tech **Scrum**: holistic (interconnected emphasis) approach for use by cross-functional team collaborating to develop new product, defines product features as deliverables & prioritises them by perceived highest value to the customer, re-evaluates priorities after each iteration/sprint to produce fulle functional features, phases: analysis, design, build, test
Scrum roles & responsibilities:
Product owner: acts on behalf of customer to represent interests, responsible for product backlog priorities & process selection
Development team: 5–9 people with cross-functional skillsets responsible for delivering product, sets own goals, organises itself, makes decisions
Scrum master: facilitates scrum process and resolves impediments at the team & org level by acting as buffer between team & outside interference
Scrum practices:
Sprint: time-controlled mini-project that implements specific portion of a system, 30 day time box with specific goals & deliverables, frozen scope defined from sprint backlog
Daily Scrum: daily meeting of all team members to report progress (15 min max), also called standup
Sprint final half-day review meeting: review & identify changes needed for following sprints
Sprint meetings: sprint planning, daily scrum, sprint review, sprint retrospective
Product backlog: customer's prioritised list of desired key features for the completed project, can only be changed by product owner
Sprint backlog: amount of work team commits to complete during the next sprint, developed & controlled by team
Scaling: using several teams to work on different features of large scale project at same time
Staging: upfront planning to manage interdependencies of the different features to develop, involves developing protocols & defining roles to coordinate efforts & assure compatibility & harmony
Strategy Importance: Project managers must respond to changes to organisation mission and strategy appropriately, if understand strategy can become effective advocates of projects aligned with firm's mission
Mistakes by not understanding role of projects in accomplishing strategy: focus on problems/solutions with low strategic priority, focus on immediate customer rather than whole marketplace & value chain, over-emphasising tech that results in projects that pursue exotic tech that does not fit strategy or customer need, trying to solve customer issues with product/service rather than focusing on 20% with 80% of value (**Pareto's law**), engaging in never-eding search of perfection that only team really cares about
Strategic management: requires every project to be clearly linked to strategy; provides theme & focus of organisational future direction (responding to changes in external env — env scanning, allocating scarce resources of firm to improve competitive position — internal responses to new programs); requires strong links among mission, goals, objectives, strategy, impl
Strategic management activities:
Review & define org mission: identify & communicate purpose of org to stakeholders, identify scope of org in terms of product/service, provides focus for decision making, used for eval org perf
Set long-range goals & objectives: translate mission to specific, concrete & measurable terms; sets targets for all levels of org in a cascaded manner; where is org headed and when it will get there; focus managers on where org should move to
Analyse & formulate strategies to reach objectives: focus on what needs to be done to reach objectives, relaistic view of past & current position, SWOT analysis, alternatives generated & assessed, strategy formulation & assignation
Implement strategies through projects: focus on how strategies will be realised with resources, maintain link between strategy (what) & impl (how), requires resource allocation, action & completion of tasks, prioritisation
SMART objectives: Specific, Measurable (indicators of progress), Assignable (to one person for completion), Realistic (what can realistically be done with avail resources), Time related (state when objective can be achieved)
SWOT analysis: internal (strengths, weaknesses) & external (opportunities, threats) analysis
Scenario planning: longer term, steps: clarifying core business & assessing drivers of change in industry env, dev potential scenatios & assess impact of STEEP factors, dev potential contingency strategies & best future strategic options, identifying early indicators & establishing triggers for strategic action
STEEP factors: social, tech, env, economic, political
Project portfolio management benefits: build discipline to project selection process, link project selection to strategic metrics, prioritise project proposal across common set of criteria rather than politics/emotion, allocate resources to projects that align with strategic direction, balance risk across all projects, justifies stopping projects that don't support strategy, improves comms & supports agreement on project goals
Project portfolio management problems:
Implementation gap: lack of understanding & consensus on strategy among to management & middle-level (functional) managers who independently implement strategy
Org politics: project selection based on persuasiveness & power of people advocating projects
Resource conflicts & multitasking: Multiproject env creates interdependency relationships of shared resources which results in starting, stopping & restarting of projects
Project portfolio sys design: classification of project, selection criteria depending upon classification, sources of proposals, evaluating proposals, ranking proposals, managing portfolio of projects
Project types: compliance (must-do, incl emergency, meet regulations, usually have penalties if not impl), strategic (directly support long-run mission, increase revenue/market share, ex: new products, R&D), operational (support current ops, improve perf, reduce product cost, improve efficiency of delivery sys, ex: upgrade building green rating)
Financial Selection Criteria: payback, NPV, IRR (internal rate of return, inverse of payback)
Payback model: measures time project takes to recover investment; uses more desirable, shorter paybacks; emphasises cash flows (key factor in business)
Payback limitations: ignores time value of money, assumes casf inflow only for investment period, does not consider profitability
Net Present Value: $I_0 + \sum_{t=1}^{n} \frac{F_t}{(1+k)^t}$, I_0 is initial investment (negative), F_t is net cash inflow for period t, k is required rate of return, want positive
Non-financial strategic criteria: capture larger market share, make it difficult for competitors to enter the market, develop enabler product which by interduction will increase sales in more profitable products, develop core tech to be used in next-gen products, reduce dependency on unreliable suppliers, prevent government intervention & regulation
Multicriteria selection models:
Checklist model: use list of questions to review potential projects & to determine accept/reject, fails to answer relative importance/value of potential project & doesn't allow for comparison with others
Multiweighted scoring model: use several weighted qualitative and/or quantitative selection criteria to evaluate project proposals, can use for comparison
Selection model advantages: bring projects to closer alignment with org strategic goals, reduce number of wasteful projects, help identify proper goals for projects, help everyone involved understand how & why project is selected
Project relativity matrix: 2 dimensions (technical feasibility, NPV), white elephant (low, low, showed promise at one time but are no longer viable), oyster (low, high, technological breakthroughs with high commercial payoffs), bread-and-butter (high, low, evolutionary improvements to current products & services), pearl (high, high, revolutionary commercial opportunities using proven tech advances)
Challenges to organising projects: need to balance needs of project with org, uniqueness & short duration of projects relative to ongoing longer term org activities, multidisciplinary & cross-functional nature of projects creates authority & responsibility dilemmas
Functional org: different segments of project delegated to functional units, coordination maintained through normal management channels, used when interest of 1 functional area dominates project or has dominant interest in project success
Functional +: no structural change, flexibility, in-depth expertise, easy post-project transition
Functional -: lack of focus, poor integration, slow, lack of ownership
Dedicated project teams: teams operate as separate units under leadership of full-time project manager, in projectised org where projects are dominant form of business functional depts are responsible for providing support to teams
Dedicated +: simple, fast, cohesive, cross-functional integration
Dedicated -: expensive, internal strife, limited tech expertise, difficult post-project transition
Hybrid/Matrix: overlaid on normal functional structure, 2 chains of command (functional & project), project participants report simultaneously to both functional & project managers, optimise use of resource (allows pariticipation on multiple projects while performing normal functional duties)
Matrix +: efficient, strong project focus, flexible, easy post-project transition
Matrix -: dysfunctional conflict, infighting, slow, stressful
Weak matrix: authority of functional manager predominates, project manager has indirect authority
Balanced matrix: the project manager sets overall plan & the functional manager determines how work is to be done
Strong matrix: project manager has broader control, functional departments act as subcontractors to project
Matrix division of responsibilities:
Project manager: what has to be done, when should the task be done, how much money is available to do the task, how well has the total project been done
Functional manager: how will it be done, how will project involvement impact normal functional activities, how well has the functiona input been integrated
Negotiated issues: who will do the task, where will the task be done, why will the task be done, is the task satisfactorily completed
Choosing the appropriate project management structure:
Organisational considerations: how important is the project to the firm's success, what percentage of core work involves projects, what level od resources (human & physical) are available
Project considerations: size of project, strategic importance, novelty & need for innovation, need for integration (number of depts involved), environmental complexity (number of external interfaces), budget & time constraints, stability of resource reqs
Org culture: system of shared norms, beliefs, values & assumptions that bind people together, thereby creating shared meanings; personality of org that sets it apart from other orgs
Org culture benefits: provides sense of identity to members, helps legitimise management system of org, clarifies & reinforces standards of behaviour, helps create social order
Diagnosing org culture: study physical characteristics (architecture, office layout, decor, attire), read about org (annual reports, internal newsletters, vision statements), observe how people interact within org (pace, lang, meetings, issues discussed, decision-making style, comm patterns, rituals), interpret stories & folklore surrounding org (anecdotes, heroines, heroes, villains)
Org culture dimensions: member identity (job, org), team emphasis (individual, group), management focus (task, people), unit integration (independent, interdependent), control (loose, tight), risk tolderance (low, high), reward criteria (performance, other), conflict tolerance (low, high), means-ends orientation (means, ends), open-system focus (internal, external, degree to which org monitors & responds to changes in external env)
Culture challenges for structuring projects: interacting with culture & subcultures of parent org, interacting with project clients or customer orgs, interacting with other orgs connected to project
Mechanisms for sustaining org culture: formal statement of principles, top management behaviour, reactions to org crises, allocation of rewards & status, rituals, stories, symbols
Defining the project: defining project scope, establishing project priorities, creating WBS, integrating WBS with org, coding WBS for information sys
Project scope: definition of end result or mission of project — a product/service for clinet/customer — in specific, tangible & measurable terms
Scope statement: statement of work (SOW)
Scope statement purpose: clearly define deliverables for end user, focus project on successful completion of its goals, to be used by project owner & participants as planning tool & measuring project success
Project scope checklist: project objective; deliverables; milestones; technical reqs; limits & exclusions; reviews with customer
Project charter: can contain expanded version of scope statement, document authorising project manager to initiate & lead project
Scope creep: tendency for project scope to expand over time due to changing requirements, specs, priorities
Priority matrix: budget/cost, schedule/time, performance/scope, constrain, enhance (optimise), accept
Work Breakdown Structure: hierarchical outline (map) that identifies products & work elements involved in project, defines relationship of final deliverable to subdeliverables & in turn their relationships to work packages, best suited for design & build projects that have tangible outcomes rather than process-oriented projects
WBS Hierarchy: project, deliverable, sub-deliverable, lowest sub-deliverable (lowest management responsibility level), cost account (group of work packages for monitoring progress & responsibility), work package
WBS benefits fro project manager: facilitates evaluation of cost, time & technical perf of org on project; provides management with info appropriate to each org level; helps in dev of OBS, which assigns project responsibilities to org units & individuals; help manage plan, schedule & budget; define comm channels & assists in coordinating various project elements
Work Package: defines work (what), identifies time to complete, time-phased budget to complete (cost), resources needed to complete (how much), person responsible for units of work, monitoring points/milestones for measuring success (how well)
Org Breakdown Structure: how company organised to discharge work responsibility for project
OBS details: provides framework to summarise org work unit perf, identifies org units responsible for work packages, ties org units to cost control accounts
Intersection of WBS & OBS: project control point/cost account
WBS coding system: defines levels & elements of WBS, org elements, work packages, budget & cost info, allows reports to be consolidated at any level in org structure
Responsibility Matrix: linear responsibility chart, summarises tasks to be accomplished & who is responsible for what on the project
RM details: list project activities & participants, clarifies critical interfaces between units & individuals that need coordination, provides means for all participants to view responsibilities & agree on assignments, clarifies extent/type of authority that can be exercised by each participant
Project communication plan: what info needs to be collected & when, who will receive info, what methods will be used to gather & store info, what are limits on who as access to certain kinds of info, when will info be communicated, how will it be communicated
Comm plan steps: stakeholder analysis, info needs, soruces of info, dissemination modes, responsibility & timing
Information needs: project status reports, deliverable issues, changes in scope, team status meetings, getting decisions, accepted request changes, action items, milestone reports