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Projects as a focus for historical analysis: surveying the landscape

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The building of the ark by Noah, so far as you will allow it a human work, was the first project I read of … The building of Babel was a right [proper] project; for indeed the true definition of a project, according to modern acceptation, is, as is said before, a vast undertaking too big to be managed, and therefore likely enough to come to nothing …[1]

Currently, more than 20% of global economic activity takes place as projects, and in some emerging economies it exceeds 30%. World Bank (2009) data indicate that 22% of the world's $48 trillion gross domestic product (GDP) is gross capital formation, which is almost entirely project-based. In India it is 34%, and in China it is 45% [of GDP]. In many public and private organizations, some operating expenditures are also project-based.[2]

For historians of technology and enterprise, observations like these should be arresting, a voice from the seventeenth century and another from 2010. Alongside or interacting with these fields' default focal points – artifacts and practices, firms and other organizations, professions/functions, and industries, is it possible that 'projects' can serve as a useful category for historical analysis? This exploratory essay will offer an overview of this question, seeking to locate technology and business projects among other project activities, to distinguish projects from other sorts of organizational forms and functions, to outline a plausible range of projects, and finally, to sketch a variety of possible, 'key' questions for future research. Indeed, in a broader sense, focusing on the ascent of projects invites us to reconsider how we think about periodizing the twentieth century, at least.

Projects have irregularly been a vector for research by historians of technology, to be sure, though most of our work has long focused on activity sponsored by or artifacts created within durable organizations – corporations, hospitals, factories, labs, agencies, or media/communications enterprises, for example. Still, several colleagues have recently published studies which place projects at or near the center of their interpretive efforts. Greet de Block has explored the 'order building capacity' of railway network construction in Belgium as a contested 1830s infrastructure project which both represented and materialized national identity in the new state's first decade.[3] In assessing the value of counterfactuals for technological histories, Jack Brown assesses the 1870s' famed Eads Bridge, Mississippi crossing project against a rival scheme offered by Chicago's American Bridge Company. Brown focuses on designs, materials, and contemporary construction practices, noting that the Chicago approach 'reflected the state of the art, while Eads's design ventured repeatedly into unknowns.'[4] Well before the railway era, as Leslie Tomory stresses, those building London's first manufactured gas supply in 1813 'had few examples to look to for modeling the construction of their own integrated network, aside

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from some water companies.' Under contract time pressures, erecting the first plant 'was rushed and chaotic,' expenses rapidly spiraled 'out of control,' and most troubling, 'there were at least three people designing and building gas apparatus, seemingly independently of one another.'[5] Contest, confusion, uncertainty, urgency, trial and error experimentation – all are regularly encountered in the execution of projects, and each element can be revealing when reconstructed historically.

My route to entering this landscape may merit an early comment. In the last decade, I have spent an increasing share of my research time investigating jet engine development, NASA aerospace innovations (the Mercury astronaut capsules), machine tool advances (recently, computer controls), and the proliferation of plastics and other new materials. Several years ago it occurred to me that virtually all this work was accomplished through projects, ranging from exploratory R&D lab tasks to collaborations among specialists on to massive investigative, prototyping, and testing deployments. Like M. Jourdain, Molière's *bourgeois gentilhomme*, I had been speaking 'project' for some time without realizing it. This recognition triggered readings in the 'project management' literature (which is generally as ahistorical as most management and engineering discourse), leading a short, speculative article.[6] The present essay thus represents an initial search for project spaces in business and technological histories, ultimately asking what difference might taking projects seriously make to familiar narratives in these disciplines? It parallels and reinforces an effort undertaken with my colleague, Dan Raff, to unpack historically processes of creating order and reliability within organizations through establishing routines and rules. Much research in organizational studies has emphasized routines in action (and in dysfunction), but all too rarely has the question of how actors devise and revise them been treated, much less in historical perspective.[7]

Projects of course are everywhere; they are a species of socio-cultural performance, distinctive from routines. Projects lean forward in time, pro-jecting into the unknown. They are uncertain, soft, variable: lacking the solidity of established constructs such as power grids or firms. Jean-Pierre Boutinet, their most rigorous assessor, outlined five domains: (1) individual or life projects, especially transitional ones as we move from adolescence to young adulthood or as we organize for relocation or retirement; (2) activity projects, chiefly learning, health, research or development efforts; (3) projects yielding objects, as in law/regulation-making or construction and industrial projects; (4) project organizations, which gather knowledge, attempt experiments, or take political stances; and (5) social projects – efforts at sparking revolutions, creating alternative social systems, or initiating self-management in groups or territories (e.g. professionalization or state-formation). All these involve movement, with those in classes 3 and 4 especially keyed to technical and business interests. Given this diversity, Boutinet recognized that 'project' is 'an unstable concept loaded with assumptions from the surrounding culture.'[8] Plainly it will also be configured differently in various historical eras.

For a very early usage in this sense, we can visit Daniel Defoe at the close of the seventeenth century, looking at his 'Essay upon Projects' (1697). As the epigraph indicates, Defoe saw construction works as projects, much as we do today, but he also regarded his as 'a Projecting Age' quite widely. Indeed, in his view, 'past ages have never come up to the degree of projecting and inventing, as it refers to matters of negoce [commerce] and methods of civil polity, which we see this age arrived to.'[9] Resonating with twenty-first century formulations, he asserted that 'Every new voyage the merchant contrives is a project, and ships are sent from port to port, as markets and merchandises differ, by the help of strange and universal intelligence …'[10] Yet alongside building work, inventions, and adventures, Defoe argued that much else needed doing. Diverse institutional projects

which would benefit Crown, commerce, and people were warranted, ranging from systematic road building and maintenance, to pensions for sailors, novel forms of insurance (including land titles), academies for education, an equitable bankruptcy court, and the regulation of banking. As individuals and associations had not the power and resources for such undertakings, Parliament and King should initiate these organizations and provisions, which were permanent, not temporary, like voyages.[11]

Here Defoe provided an early example of the project concept's complex instability – devising something new is a project, but running the completed thing (a roadway or insurance fund) is a project no longer. Instead this becomes managing a firm or a research establishment. [The ambiguities of *managing a project* derive directly from this, insofar as the project is unstable, slippery and evolving through elaborate and unanticipated feedback loops.] Moreover, some activities consist only of recurrent projects ('every new voyage'); some arise from state interests and others from private spheres, at times authorized by Crown and Parliament, sometimes outside the realm of statutory consideration. Sorting out these overlaps is thus the next task, so as to outline projects' domains. The main question is how to locate projects in larger, modern socio-economic processes and contexts? A secondary one involves separating projects from other activities.

Two claims are central to engaging projects more fully: first, that they represent something distinctive in form and function and second, that they are crafted as temporary organizations. To start by outlining 'distinctive from what?', consider a simple distribution of organizational activities (Table 1), broadly applicable to enterprises of middling and larger scale in the spatially- and temporally-lagged, entwined processes of industrialization/urbanization/modernization. Organizations, for-profit or not, act both inside their boundaries (here, 'operations') and across them ('interactions'). The characteristics indicated under 'process,' 'flows,' 'outcomes,' and 'rule set' are suggested as typical, not uniform. In some operations, for example, authority may be hierarchical in general, but more collaborative within a specific unit, whereas some contracts may be entirely routinized. That noted, in the right-hand column are activities that only some enterprises attempt: projects. These efforts do not conform with the most common tasks within organizations or between them and clients, agencies, or competitors. Projects are non-routine, going somewhere, with often either the route or the goal underdetermined, inchoate, or ill-defined (sometimes all three). Hence, my inclusion of terms from the periphery of technical or managerial thinking: unknowable, reflexivity, improvisation – terms which

Table 1. A simplified sketch of organizational activity.

Core Activity	Operations	Interactions	Projects
Location	Organizations: inside the boundary	Settings: across the boundary	Sites: beyond usual boundaries
Process	Routinized	Individualized	Exploratory
Flows	Hierarchical	Open-ended	Collaborative
Outcomes	Expected/predictable	Ritualized/ dynamic	Unknowable
Rule set	Protocols/standards	Reciprocities	Reflexivity & improvisation
Examples	Accounting, reports, production, line mgt, evaluation	Contracts, sales, patents, licensing	One-off problem solving, innovation trajectories, experimental development

express not an *extension of* operations (as do interactions) but a *tension with* operations.[12] This distinction and these tensions lead some managements to attempt governing or taming projects their enterprise has initiated (notably R&D and product development units) or to externalize such work through contracts, with high levels of specification. When 'successful' such maneuvers transform projects into *tasks* (without acknowledging the change), reformulating their ambiguities into 'known' elements and transforming their exploratory and reflexive functions into reporting and assessment. Hence we may envision a spectrum from tasks to projects, on which non-routine activities may be located according to their initial transparency and expected manageability, so as to sort special tasks assigned to teams (though labeled as projects) first, from tasks gone awry (hence becoming exploratory projects), second, from synthetic or analytic projects (demanding complex integration or refinement of knowledge, materials, or practices) and finally, from edge projects (with multiple unknowns, unclear boundaries and uncertain destinations). Within a sector, say food processing, aeronautics/aerospace, or insurance, the distribution of activities across this spectrum should be expected to change, for reasons that bear closer investigation. It may be worth adding that this particular way of organizing a world of activity both resonates with and is frequently exemplified in studies by Bruno Latour, who has regularly emphasized the need for actors to negotiate, recruit, and redesign on the fly and who has both been engaged in projects and analyzed them.[13]

Second, projects' fundamental instability intensifies insofar as they are articulated as 'temporary organizations.' A cohort of chiefly-Scandinavian scholars has developed this crucial insight, based on shifting their managerial focus from structure and decision-making to behavior and action. This move derived from 'the general criticism of the rational assumptions underlying the decision-making perspective,' not least the notion that decisions cause actions and take place prior to them. A generation earlier, James March and J.P. Olsen's disruptive garbage-can research/theories showed that decisions often follow actions and 'may be made to legitimize actions already taken.' Indeed, 'there may not be any logical connection between decisions and actions.' Given that 'projects are almost always motivated by a need to perform specific actions,' they present an appealing platform for analyzing organizational dynamics (an approach which could fold into a broader reconceptualization of 'permanent' organizations as well, but has not yet done so, to my knowledge).[14]

What defines the temporary organization? Rolf Lundin and Anders Soderholm present four dimensions: time limits and urgency, a focused target, a team orientation, and an emphasis on achieving change (transition).[15] These 'four Ts' are valuable pointers, and I think could be supplemented, thinking historically, with 'four Ps': period, problem set, players, and performance – yielding eight parameters. *Time limits* reference the startup condition. The organization is designed to vanish, whether successful or a failure, even as pressure for results is continuous, often intense. Second, the organization has no warrant for self-definition; its *targets* have been framed by others, often by outsiders who have convened the enterprise as an instrument to achieve them.[16] Third, because the means to the goal are not obvious or are complex, if understood, *teamwork* (not task assignment) is crucial, with feedback from multiple investigators, experiments, trials, or designs-in-use providing invaluable, critical reflexivity. Understanding who's on the team (individuals, firms, advisers), what their responsibilities are, how they were chosen and by whom is critical information. Fourth, temporary organizations intended to reinforce the status quo are fakes; rather, a TO's core challenge is to alter the present state of affairs, creating openings for workable, situated resolutions and perhaps longer-term

transitions in orientation. Being alert to *why* these transitions/changes are thought advisable or necessary leads us toward the four P's.

For the historian, context is as significant as form or function. Hence determining *period* has two referents – one, locating the TO in its contemporaneous setting, amid trends in markets, technology, regulation, and culture (think of constructing the US transcontinental railroad vs. Boston's Big Dig 130+ years later[17]), and two, identifying the anticipated work period for its activity (this may range from a weekend for an advertising-design proposal team to a decade for delivering a nuclear-powered submarine). After all, how temporary is temporary? At times, TOs morph into enterprises, a process both historical and significant, thus meriting research. Here one useful query is: how well did originators estimate the process time needed (did they do this at all?), and when a substantial delay opened, why so? The *problem set* is the collection of questions with which the TO commences; this is not the target (much less the 'task'[18]), but rather the reference collection of challenges and resources (what we need to do, what we know thus far) that animate the work process. Considering the *players* brings stakeholders into the mix, and more important, their relationships with the TO team – as funders, clients (past, current or prospective), users, consultants, rivals, or overseers.[19] This highlights the inter-organizational context, just as problem sets frame the TO's intellectual or information contexts. Last, *performance* gestures toward what measures will signal success, progress, reorientation or failure, and hence the TO's own assessment upon dissolution. Together, these eight factors could become keys to re-constituting temporary organizations in practice and in history, thereby providing some systematic insights into projects, viewed from the inside out and contextually.[20]

Remembering projects' placement in Table 1, two further observations may be worthwhile. First, while vast literatures have developed on organizations' operations and interactions, in engineering practice/policy research and technological/business history alike, appreciation for projects is nowhere nearly so fully engaged. In part this may be due to the much longer history of organizational analysis, reaching back past Max Weber to Adam Smith,[21] vs. the relatively sudden salience of projects, which arguably become gigantic and worldwide in 1930s construction programs and expand during World War Two in the Allies' temporary, but juggernaut cross-boarder efforts to organize and coordinate technology, manpower, logistics, and entire economies. To be sure, project managers have been striving for disciplinary recognition across several decades, generating several high-quality journals,[22] outnumbered by hundreds (by now, thousands) of business and technical practice periodicals. Project management has also established certifications of professionalism, institutes for training and knowledge-sharing, and theoretical bases for research programs, with only modest impact on mainstream management practice.[23] Given that finance increasingly dominates managerial thought, this could change, to the extent that imaginative, opaque, and dangerous financial products, rather than being viewed as the result of scientific research, and thus reliable, solid, and unproblematic, are analyzed as resulting from urgent, contingent team projects, making them likely to contain errors, contradictions and unexamined assumptions. Aggressive reframing of finance's quasi-scientific claims could enhance the legitimation of project management perspectives. Critical voices in the field have rightly assailed futile searches for the 'one best way' in or a general theory of project management, but only in 2010 was a special issue on project history in a disciplinary journal announced (published in 2013).[24]

For decades, neither project management scholars or business/technological historians have regularly investigated project histories and/or projects as history.[25] Why should this be the case? Within project management, moving ahead seems far more important than

reflecting on failures or mining successes for guidelines. Calls for project leaders or funders to prepare histories have rarely been heeded (though provocative exceptions will be discussed later). This is consistent with current-day actors' general indifference to history – as template, as warning, as context, and most subtly, as a durable critique of prescriptive modeling and grand theorizing.[26] Accounting for historians' lack of concern demands a bit more effort, here confined to a short practical remark and a longer conceptual reflection, both confined to the business history domain.

As handed down from the founders, business history anchored itself in the operations and interactions of firms, especially long-enduring, very large corporations. Projects, other than permanent, high-profile corporate R&D divisions, seemed peripheral or tangential to mainstream enterprise narratives. Equally, temporary organizations, even large-scale construction projects, represented short-term, ephemeral activities: the question of how railroads could be operated at a profit overshadowed issues of how they could be built in the first place. Again, this made sense in the Chandlerian era, though it's no longer tenable as historical practice.[27] Such commitments help explain business history's long silence regarding building, publishing, military contracting, entertainment and fashion sectors, some of which at last are securing scholarly attention.

Reflecting conceptually leads us toward thinking about historical, rather than historiographical, dynamics. Put simply, projects were appreciably less central to classic Second Industrial Revolution capitalism, yet became a core feature of the floating globality attending post-1970s competition and restructuring.[28] Central to this distinction is Zygmunt Bauman's work, memorably expressed in contrasting the solid/heavy modernity fundamental for nation-centered industrialization (ca. 1870–1970) and the liquid/fluid/light modernity which globalized, finance-centered capitalism fostered during and following a brutal, transformative decade from the first oil shocks to the inflation-crushing Volcker recession and its aftermath into the mid-1980s.[29] Like all dyads, this opposition simplifies more-complex and uneven phenomena (especially in location and incidence), yet in using it, Bauman highlighted and theorized an epochal reconfiguration.

Roughly from the mid nineteenth century, industrializing regions fabricated solid modernity along with their goods, devising a world in which enterprise managers were 'obsessed with bulk and size, and for that reason, also with boundaries, with making them tight and impenetrable … In its heavy stage capital was as much fixed to the ground as were the laborers it engaged.'[30] This was

> the era of shaping reality after the manner of architecture or gardening; reality compliant with the verdicts of reason was to be 'built' under strict quality control and according to strict procedural rules, and first of all *designed* before the construction works begin.

In such situations, managerial control was critical, 'and control meant first and foremost the "taming of time," neutralizing its inner dynamism; in short, [creating] the uniformity and coordination of time.' Solid modernity was thus focused on efficiency, bureaucratic routine, surveillance, and systematic rewards (and sanctions), a system Bauman argues embodied a 'tendency toward totalitarianism.'[31] In such environments, corporate integration and technological standardization fueled growth and competitive victory, at least for what became the great multinational corporations. Business projects involving uncertainty and innovation were internal matters, first directly controlled by top executives (consider Andrew Carnegie scrapping nearly new machinery to achieve a volume-production cost edge), then by division managers or executive staff (for twentieth century R&D units seeking to routinize discovery[32]).

By the 1970s, this entire system was in flux, yielding in a generation a series of different imperatives and expectations, plus shifted conditions of work and marketing.

> In the fluid stage of modernity, the settled majority is ruled by the nomadic and extraterritorial elite … It is now the smaller, the lighter, the more portable that signifies improvement and progress. Traveling light … is now the asset of power. It is the mind boggling speed of circulation, of recycling, ageing, dumping, and replacement which brings profit today – not the durability and lasting reliability of the product.[33]

In consequence,

> Having shed the ballast of bulky machinery and massive factory crews, capital travels light with no more than cabin luggage … [The] new attribute of volatility has made all engagement, and particularly a stable engagement, redundant and unwise at the same time: if entered it would cramp the movement and detract from the desired competitiveness, [obstructing] options which may lead to increased productivity. Stock exchanges and boards of management around the world are prompt to reward all steps in the right direction of disengagement … while punishing just as promptly any news of staff expansion, increased employment and the company being 'bogged down' in costly long term projects.[34]

The only thing permanent on this landscape is uncertainty, even for those who fashion strategies to exploit novel opportunities. Bauman left historians the task of determining the means and mechanisms for this reconfiguration,[35] but decentering and liquefying the character of corporate authority, reducing 'stable engagements,' triggered a proliferation of projects as modes of business action. Solid modernity's construction works operated as projects, but liquid modernity's industrial, service, commercial, distributional, and financial firms began creating more of them, by the carload.

Bauman acknowledged the salience and hazards of projects in a 2004 address:

> Having a project means that you make things different from what they are at the moment; you change [things]. And when you have a project, then there is always a problem. You need to coordinate, to gather together a number of people to direct their efforts towards implementation … *A project is not a reality.* It is 'under-determined'; there is no certainty that your aims will be fulfilled. There is always a risk that a mistake could be made, that a wrong turn could be taken and then, instead of implementing the project, you will actually make its implementation more difficult. So there is a risk of many, many people whose work should be coordinated but might not be. And there is also the problem of trust. Could you actually trust them, that left to their own resources, without instruction, without attention paid to them, without correcting their false moves, they will actually work towards implementation of the project?[36]

As with Boutinet, the ambiguities and difficulties of projects surface quickly here, so different from the solidities of routine bureaucratic practices. Projects are opaque and processual, not transparently reliable, indeed 'not [even] a reality.'

Why then are projects increasing so resolutely in Liquid Modernity? Perhaps because instabilities and uncertainties have percolated through the global business environment to such a degree that protecting core institutions (core assets) from internalizing uncontrollable claims or sources of disaster has become a management priority. Perhaps investor imperatives for reducing operating costs and commitments to staff and facilities favor outsourcing and contracting activities once integral to enterprise competencies. Perhaps project swell out of a deepening recognition that unanticipated change has become endemic, that rationality compasses only segments of unfolding dynamics, and that funding explorers is a worthy effort when customary practice falters.

Challenges for project workers are also daunting, as Bauman documents:

> I recently gave an interview with the BBC, and on this occasion I made friends with a research assistant who worked for the programme for which I was interviewed. That was a 40-year-old man, and he told me that he had been working for the BBC for 16 years but he hadn't got a steady job and no pension rights. So how does he work? He works from one project to another, jumping all over the globe without really acquiring expertise in any particular field. The only expertise which he did acquire was *the expertise in switching quickly* and, as much as possible, painlessly from one field to another and developing completely new skills for the next project … So our society is integrated by projects. We live from one project to another.[37]

In sum, exploring projects as business/technological history offers openings both toward appreciating the activities of traditional project-centered enterprises over the last two centuries, as well as toward understanding major dislocations for many industrial world companies and workers – which simultaneously became project opportunities for other firms and employees, in some places creating specialist project enterprises, and elsewhere elaborating routes into transnational contracting for entrepreneurs outside the traditional West. Research that brings depth and detail to Table 1's Projects column seems warranted, seeking to establish how much of what had been durable became contingent (in organizations, investments, occupations, relationships, and even identities), through what mechanisms, and why.[38]

After all this attention to concepts and contexts, redeeming the opening pledge to 'outline a plausible range of projects' is next on our agenda. Here I'll first consider three defining parameters: scope, scale, and sector, which are directly linked to time/urgency and costs (expected and actual). Next, I will outline a range of sources for projects and formats in which projects are executed. *Scope* references the known-to-unknowns spectrum mentioned above, from defined tasks to unruly tasks to synthetic/analytic projects to edge projects. In moving from left to right along Table 2's scope line, toward the unknowable-in-advance, are there corollary increases in complexity, in resource needs, in diversity re ecologies of skill, and/or in unintended consequences? My sense is that this cannot be read off in advance, that, at least since roughly the 1920s in Western Europe and North America, these relationships depend by turn on *scale* and *sector*, offering the prospect of a three-dimensional matrix of variation (but likely having lots of empty cells).[39] As well, the dual sequence parameters (known to unknown, simple to complex) may not co-vary. For example, though the scale of projects and the required personnel may be expected to increase sharply from a four-person tiger team assigned to analyze material failure and redesigns in an aircraft part, to ten thousand or more workers simultaneously engaged with a highway building project, the latter may be complicated but known and the aircraft solution simple but unknown.[40] In between scale extremes, many

Scope	known tasks →unruly tasks → synthetic/analytic projects→ edge projects
Scale (staff, budget, time)	tiger teams → innovation groups → core focus firms → megaprojects
Sector (examples)	construction, consumer products, communications/high-tech, med/pharma, aircraft/aerospace, new materials, non-material goods (software, algorithms)

Table 2. Variation in project parameters (known → unknown; simple → complex).

combinations should be expected: small specialty design firms working technical edges with very large budgets vs. sizable standardized housing project squads doing more routine work with much less spending per head (or even in total).

Were it up to me, I'd look to start researching historical projects sector by sector, seeking patterns of scope and scale variation generationally. Obviously construction would likely be the oldest warrior, but communications and electrical sectors certainly had, in the US, significant project elements by the late 19th/early 20th centuries. US Cold War contracting and development practice did much to multiply projects as expected formats for exploratory work, but no smooth diffusion lines spiraled out to private sector initiatives in electronics, finance, or consumer goods projects. All of which is to say that, as with much else, clean linearities are rare historically; messy and situational connections are more common, featuring unanticipated borrowings and occasionally parallel, near-simultaneous invention/adoption of quite similar approaches. Just as there can be no universal history of the computer or the firm, there will be no general history of the project. As well, given that particular histories in those reams cannot generate an integrated master narrative, histories of individual projects cannot be expected to do this either. Hence, middle-register initiatives, here perhaps by sector, may define an actor-ordered domain having some resilient characteristics across time, permitting equally-resilient researchers to assess changes, utilizing the eight dimensions sketched earlier (the 4Ts & 4Ps).

What about sources for project initiation and possibilities for their formats? Consider the following options, given that technological and business projects are commissioned and that they may be prosecuted in different ways.

SOURCES: individuals/groups, firms, collaborating organizations, states and agencies (military and non-military, city/state/national), NGOs (within nations/regions and transnationally), non-profits (foundations, universities, arts/cultural, research institutes, professional organizations, freestanding labs).

FORMATS: managerial tasking (internal to firm or organization); bid/contract (external agents/consultants/teams); alliances/multi-organization links (among firms, states, agencies, NGOs or a blend); special-purpose institution creation (Manhattan project, NASA, Sematech); open-source inclusion and spontaneous self-organization (hackfests; crisis-management teaming); state-sponsored mobilizations (weapons[41] or information system development).

Clearly wealthy persons or clusters of them can sponsor projects,[42] as can associations of enterprises, professionals, or states (on this last, think about the complexities of creating a system of European air traffic control[43]). Non-profits are supremely overlooked, but they surely think in terms of projects, perhaps as frequently as operations or interactions. On this terrain were mounted Carnegie's libraries, the Rockefeller Foundation's medical research, public health and development projects, or the cycles of exhibition and collection efforts museums and archives have initiated for generations. These are projects because they are not simply operations or interactions, but rather are collaborative and exploratory, involving uncertainties, complexity, and management, even though they do not anticipate returns to investors.[44] That projects can be executed in many formats is not news, but thinking synthetically about the sources of and formats for projects, in historical time, and in relation to a conceptualization of project elements (incomplete here, to be sure) could provide usable tools for researching this increasingly significant dimension of technological, business and social practice.

Next, let us turn back to *firms and organizations*, so as to outline one more array of options, considering projects as actions or behavior. Here I suggest six preliminary

categories, derived largely from Table 1, which are empirical and remain to be theoretically integrated with the preceding discussion. First, we find organizations that simply operate and interact – they do not do projects. They make fasteners, butter, or bow ties, sell them directly to users or through intermediaries, or they provide services in an uncomplicated way, as once did America's local banks, life insurers, or cemeteries, as well as today's coffee shops, dry-cleaners and fast food outlets. Many museums with essentially static collections or agencies with stable missions also stand outside the projects domain. Second, third and fourth, we may identify firms that operate and interact, but that sponsor projects which can be described within three domains (in action terms): as situational/special, peripheral or axial. For example, in the *situational* mode, a staples-producing firm or a bulk shipping enterprise which discovers its core business environment is declining may initiate a 'futures' project, bringing in consultants to provide alternative strategies. Similarly, re-engineering efforts, plant-relocation site reviews, or status analyses anticipating a merger offer would be *special* projects. By contrast, a consumer appliance firm may annually invite inside designers or outside consultants to update its product range or create improvements to existing models. As with the situationals, these projects are far from trivial, but they are *peripheral* to the firm's main challenge, making and selling refrigerators, washing machines, et al. Indeed, they may be so routine (selecting the annual new lipstick shades for a cosmetics firm) as to fall well to the tasks side of the tasks-to-edge projects spectrum. Most mass and much specialty production functions in this way, with the latter seeking seasonal novelties to feed into well-established production and distribution networks.

However, projects are *axial*, I suspect, only to organizations which define themselves in terms of recurrent differentiation and persistent innovation, all handled by means of serial, overlapping, competitive, or parallel projects. Film production after the integrated studio era fits the bill here, as does much aircraft, aerospace, and satellite production (military especially). Construction, of course, also qualifies, but we must again keep in mind the spectrum from routine undertakings (Levittowns) to unique works thick with unknowns (particularly megaprojects that reflexively undercut planning[45]). Here we would also locate all varieties of one-off making and serving (custom software designers, for example). In this fourth class, some project-axial organizations operate and interact *only* from project to project, seeking clients or targets, as with building rehabilitators, event and convention planners, litigators (not inside or of-counsel lawyers), and car repair shops. Other axials organize projects, coordinating design, procurement and work, for example, as general contractors do, or they sponsor divisions which focus on project work and experimental development, as many US military contractors have done.[46] Very large defense firms may have substantial production facilities, but their continuing operation depends on securing a series of major project commissions.

Fifth and sixth, one additional cluster of organizations contributes to and depends on others' projects, whereas another runs projects which contribute to sustaining others' operations. The *project contributors* most frequently can be found among the ranks of specialist subcontractors augmenting the capabilities of core project-based firms, as with the dozens of metalworking, testing, and instrumentation firms in the Los Angeles aerospace complex (1940s–1980s), who made components for McDonnell-Douglas landing gear, GE jet engines, and NASA rockets (and redesigned them repeatedly when deficiencies arose). Similarly, contemporary advertising subcontractors work behind the scenes with lead agencies to supply animation, audience testing, or studio film/video components for ad projects. By contrast, *operations contributors* are firms that devised and implemented projects on contract, often for companies with situational project needs – in

twentieth century North America, multiple consultancies, freestanding public relations firms, advertising agencies, and opinion pollsters. These six classes represent a first-cut effort to consider projects as organizational deployments, gathering together their initiators and executors in a relatively simplified fashion.

Two shape-shifting historical processes also appear on this evolving landscape: projects which become firms, and firms which become projects. The first is a relatively straightforward genesis story: a temporary team or alliance created to deal with specific challenges, technologies, or integrative challenges is spun off as an independent enterprise, or its members defect from their employers, or top management recognizes the salience of the team's functions and institutionalizes them as a department or division of the larger operation. For example, Simon Ramo and Dean Wooldridge extricated themselves from Hughes Aircraft in the 1950s, where their military engineering project team had become entangled with Howard Hughes' increasingly bizarre management directives, forming the Ramo-Wooldridge Corporation, which within days had DOD letter contracts 'to provide science and engineering analysis' for a 'strategic missiles evaluation effort.'[47] Similar origin stories abound in high-tech circles, perhaps most famously the 1957 walk-out by eight top engineers at William Shockley's Semiconductor Lab in Palo Alto to form Fairchild Semiconductor,[48] with the backing of the Fairchild Camera and Instrument Company. Defection by project teams or individual members to create new firms became a Silicon Valley pattern, aided regularly by a rising cohort of venture capital financiers, seeking to underwrite 'the next new thing.'[49]

The converse, firms becoming projects, in its most vivid form can be realized as the consequence of projects becoming firms, through the mechanism of the Initial Public Offering (IPO). Here we find the 1990s dot.com era phenomenon of company creation in order to realize substantial profits through the project of selling, not running the company.[50] Some proportion of these promotions skated close to the edge of securities fraud, as John Cassidy has argued. However the core point for our purposes was their founders' intentions not to operate and grow their enterprises, but instead to use one great idea (a 'category-killer,' or a 'killer-app') as a platform for 'cashing out,' through public stock issues or a contractual sale to an industry giant. The most notable figures in these domains are what Mike Wright and his collaborators term 'serial entrepreneurs,' who repeatedly start firms *in order to sell them off*, then repeat the drill. When and how this pattern took shape is a matter for historical investigation, of course.[51]

Considering, briefly, project histories and the project management discipline will bring this discussion to some closing thoughts about research issues. Projects are surely a constitutive element within technological and business history, though determining their long-term scale and significance remains to be attempted. Sources could be one problem for researchers, but a WorldCat search for archives on building and road construction turned up over 800 collections in the US alone. As one example, the Hagley Museum and Library holds 266 linear feet of materials from John McShane, Inc., a Philadelphia building contractor, the US's 50th largest in 1950 with $100,000,000 in annual billings. The collection description notes:

> In 1939 [McShane] received the contract to build the Franklin D. Roosevelt Library at Hyde Park, N.Y. During the 1940s and 50s McShain became one of Washington's most visible and successful building contractors. His projects included the Jefferson Memorial (1939), the State Department Building (1940), National Airport (1941), the Internal Revenue Building (1942), the Pentagon (1943), the Army Map Service Building (1943), [&] the White House renovation (1950–1951).

Scholars seeking to explore construction projects will not likely be disappointed by a lack of preserved documentation.[52]

The records of projects internal to firms may be more elusive, as project management scholars have reported that, despite many calls for drafting project histories for reflection on successes and shortcomings (or for planning), few efforts along these lines have appeared. Yet historically, project documents and histories abound – thousands of research reports and assessments, for example, in the DuPont Co.'s Engineering Division records, and hundreds more in files from Sperry, MCI, or the Pennsylvania Railroad (again these also at Hagley). The US military, particularly the emergent Air Force, undertook thousands of project histories from the 1940s, analyzing communications and weapons development, airframe and propulsion innovations, procurement and maintenance practices and airfield construction.[53] In parallel, the RAND Corporation created a series of what they termed 'development case histories,' focused on military aircraft, concluding that major uncertainty accompanies projects seeking 'a real technical advance.' Writing of radar's emergence, T.A. Marschak indicted efforts at comprehensive advance planning and linearity in R&D thinking. Trying to improve on wartime cut-and-try tactics, postwar managers aimed 'to avoid successive modifications and to proceed directly, by careful planning, to the final production models.' However, drafting extensive requirements/specifications in advance and obstructing learning by doing, using, and failing yielded costly delays and waves of design changes. Key lessons here, at least in regard to technical advances, were rarely integrated into later projects.[54]

Memorably, the US Navy commissioned a comprehensive project history of the Polaris missile not long after its full deployment, a study whose frankness doubtless ruffled feathers in the defense establishment.[55] Equally remarkable, General Electric funded a seven year internal project history, modeled on Air Force practice, to trace the creation of its first supersonic jet engine, the troubled J79. The Preface to Volume II (August 1956) reads:

> This document has been written to inform those in company management of the problems encountered and the solutions evolved in carrying forward the development of the J79 engine … It is a factual work, not a critique. The intent of the authors is to reflect the status of the opposing design considerations of performance, weight, reliability, durability, and serviceability. We have attempted to portray the decisions made and the quantities associated with them in the inter-related fundamental areas of schedules, costs, manpower and markets to serve as criteria in planning and judging the progress of future engine projects. It is our hope that this document will help preserve the 'know-how' gained in administering this undertaking, which has been large in the expenditure of technical effort and defense dollars.[56]

Though finding similar documents for small firms may be a challenge, companions to these doubtless can be unearthed.[57]

Project management scholars have been diligent over the last two decades in probing their discipline's assumptions and practices and are now commencing an engagement with history.[58] Before starting project research, historians might wish to familiarize themselves with the perspectives their policy and practice colleagues have developed. In addition to conceptualizing the temporary organization, three aspects of their work strike me as valuable in framing historical research. First is the persistent critique of the 1970s positivist starting point for project management theory and practice (at least on English-speaking terrains). Expectations drawn from economics concerning the rationality of situations, knowledgeability of actors, and transparency of options have been widely rejected,

as has the quest for a general theory of project management. Instead projects are increasingly recognized as unique, complex, uncertain, and constrained, hence non-linear and unpredictable.[59] Second, researchers have followed up on integrating these concepts and configurations into contemporary project research which can help historians identify key issues to explore in their studies.[60] Last, PM scholars have raised the question of project motifs and forms percolating widely outside business environments, inquiring into the 'projectification of society' as a long-term process.[61] This brings history again into relation with practice and resonates with issues about our version of modernity raised by Boutinet and Bauman, and about projects' role in the complex transitions they identified.

If historians are to explore projects, what questions might they pose, questions whose answers would help position projects in relation to operations and interactions, or in relation to the hierarchies, markets, and networks that represent default settings for conceptualization? Starting with basics, periodization and localization of project developments would be ideal. For example, recent work by Kate Epstein indicates that US military procurement shifted in the 1890s from purchasing finished objects to initiating technical development projects in collaboration with enterprises, thus moving the origin era for the military industrial complex back several generations from World War Two.[62] If this relationship, forged due to the increasing physical and technical complexity of weapons, ships et al., emerged in the Second Industrial Revolution, where else across the bellwether industries of that period might we find similar projects? In chemical production? Electrical machinery? Telephony? Urban transit and office construction? How and why were they initiated, with what agendas and with what implications? Especially, how did substantial construction projects change organizationally as new materials, power supplies, and communications capabilities evolved? Second, what are the locational patterns of project proliferation or of the spread of subcontracting? Are there urban hothouses for projects (New York or Chicago from the 1880s, Los Angeles from the 1920s)? Did projects multiply in North America earlier and faster than in Britain or France?[63] Whence arose transnational projects (consider underwater cables for telegraphy or defining radio frequencies' distribution in interwar Europe) and what patterns of learning or rupture followed?

On a different front, what discursive tropes have structured project plans, reports, and assessments and how have these changed across the last century? When and where was the state either a force for or a drag on the multiplication of projects, and why in either case? Are cultural sectors (often under-researched in business and technological history) precursors of project work's expansion, ranging from art galleries to publishers to photographers and film makers? How do state-created projects undertaken in socialist/communist polities resonate with those in capitalist nations (comparative dam-building or electrical supply development might be instructive, for example)? How do infrastructure projects differ or echo one another in colonial regimes? And perhaps in both Solid and Liquid Modernities, might the configuration and scope of projects signal settled, contradictory, or emergent relationships between states and markets?

Interior to projects as working organizations, to what degree is learning and information sharing conditioned or obstructed as we move across the spectrum from tasks to edge projects? How may management be differently articulated (and with what consequences) in projects of varying form (scope, scale, sector)? What empirically defines a range of project management approaches and how do sponsors learn what sort of project they have at hand? What role do educational institutions play in articulating imperatives for project management, both during the Cold War (a much discussed phenomenon) and before (particularly in engineering and construction)? What relationship might historical

studies have with project management theory and practice, given the many pitfalls of 'applying' history to current concerns? Finally, what priority should project research have, given the multiple threads of scholarship, classic and novel, currently in play? My view, unsurprisingly, is that by turning the lens of organization toward projects as historically significant, we will generate unanticipated insights, open new venues for research and conceptualization, and deepen our appreciation for the unexpected outcome and the emergent contradictions that so often accompany enterprise and technical venturing.

To conclude, though defining projects is a complex job, perennially incomplete and at moments frustrating, attempting to conceptualize projects is still necessary, while remaining perennially open to critique and revision. Projects strongly resonate with uncertainty, innovation, creativity, ambiguity and conflict – features of organizational environments that often have had a strained or unclear presence in business history, though less so in the history of technology. They are complex and underdetermined, as Bauman noted; unknowns proliferate and delays, cost overruns, and goal shifts arise from both errors and learning. More deeply, if the recent proliferation of projects is generating a reflexive projectification of society, economy, and perhaps politics as well, if spreading temporariness is triggering what arguably permanent instabilities, then reconstituting that proliferation's lines of development (in and after the 1970s, I'd think), plus alternatives once on offer (and likely still worth exploring) would be a worthy priority. For historians, a project on projects should generate ample returns, both in critical understandings and in bases for countervailing actions.

Notes

1. Defoe, "An Essay upon Projects," 38.
2. Bredillet, "Blowing Hot and Cold," 4. Interestingly, the World Bank's website, which lists hundreds of its own projects, does not provide a working definition of 'project.'
3. de Block, "Designing the Nation: The Belgian Railway Project."
4. Brown, "Not the Eads Bridge," 536.
5. Tomory, "Building the First Gas Network," 77, 83–84.
6. Scranton, "Le management du projet."
7. This work materialized in a two-phase conference, "Getting It Organized," held at the Wharton School, University of Pennsylvania in Fall 2012 and Spring 2013. A set of revised essays are being evaluated for publication by a university press, at this writing. GIO derives from our close reading and reflection on fundamental texts in organizational studies and evolutionary economics, particularly Nelson and Winter, *An Evolutionary Theory of Economic Change*, and earlier, Cyert and March, *A Behavioral Theory of the Firm*. See also March, "Exploration and Exploitation."
8. Boutinet, *Anthropologie du Projet*, 82, 88–120. For another helpful effort at conceptualizing projects, see Cova and Salle, "Project Marketing and Project Management."
9. Defoe, *Essay*, 31.
10. Ibid., 33.
11. Those familiar with British history will recollect that only a few of Defoe's projects emerged in the eighteenth century, for example multiple varieties of insurance. His prescience about roads, academies, pensions and the like remains noteworthy.
12. These terms are central to Karl Weick's broad-ranging studies of management as social practice, viz., *Sensemaking in Organizations*, and *Making Sense of the Organization*.
13. See Latour and Woolgar, *Laboratory Life*; Latour, *Science in Action*; ——, *Aramis*; —— and Peter Weibl, eds., *Making Things Public*; and the remarkable *Laboratorium*, the catalog of a multi-media exhibition on laboratories in which Latour was involved.
14. Lundin and Soderholm, "A Theory of the Temporary Organization," 438; Cohen et al., "Garbage Can Model"; Turner and Muller, "On the nature of the project as a temporary organization"; Sahlin-Andersson and Soderholm, *Beyond Project Management*, 20.

15. Lundin and Soderholm, "Theory," 438–444.
16. This suggests that a project has not an enterprise's presumed autonomy. In practice, there are enterprises which live on/for projects, however, and these will have to have a place in any schematic. See Hobday, "The project-based organization."
17. See Borneman, *Rival Rails*; and Brown-West, *From Dream to Reality*.
18. "Task" is the second T-item that Lundin and Soderholm adopted, but for my purposes it implies too concrete a focus and too much knowledge ability by planners and actors. Auditing accounts or reducing a product's manufacturing cost are tasks (well-known methodology, standard referents, etc.); creating a successful New York play or musical is a target (lots of e.g. large numbers of soft variables, multiple unknowns), viz. "The Producers" (see http://en.wikipedia.org/wiki/The_Producers_%28musical%29).
19. The *players* notion draws inspiration from actor-network theory, for which see Law and Hassard, *Actor Network Theory and After*.
20. I have avoided using the term "projects" when sketching temporary organizations, because while I believe that all business and technical projects are TOs, it is hardly clear that all TOs are business or technical projects. Consider a jury, a Boy Scout troop, a bowling league: all are intentional organizations with targets, differing memberships and life spans, teams, et al.
21. March, "The Study of Organizations and Organizing Since 1945".
22. These are *Project Management Journal* (*PMJ*) and the *International Journal of Project Management (IJPM)*.
23. This makes sense, because few operations or transactions managers need to know anything about projects, or at least imagine so. What wasn't workable was project management writers' 1970s/1980s thirst for scientistic, positivistic theories/models which, in essence, aimed to transform projects into tasks and functions transparent to line managers and executives. Projects reluctance to conform demonstrated their persistent elusiveness and viability. As Bruno Latour has noted: "Projects drift. That's why we call them research projects." [*Aramis*, 92.]
24. Jonas Soderlund and Sylvain Lenfle announced this issue of *IJPM* on November 30, 2010. It was published in July 2013 (volume 31).
25. However, such perspectives have arisen in other "neighborhoods." See e.g. Engwall, "No project is an island"; Lisa Bud-Frierman et al., "Weetman Pearson in Mexico"; Bonaccorsi and Giuri, "When shakeout doesn't occur"; Kreiner, "In Search of Relevance"; and Midler, "Projectification of the Firm." One internal commentary is: Lehmann, "Connecting changes to projects."
26. However, an important reflective study, focused on historical patterns in large construction projects is Morris and Hough, *The Anatomy of Major Projects*.
27. As I have argued elsewhere, similar silences surrounded innovative specialty manufacturers, supplying stylish consumer or high-specification capital markets, in favor of extensive attention to mass production corporations and transport or insurance giants.See Scranton, *Endless Novelty*. For an alternative view of railroads, with fair attention to construction projects, see White, *Railroaded*.
28. For more on the rising tide of project work, see Lundin and Stablein, "Projectization of global firms," and Cooke-Davies and Arzymanow, "The maturity of project management."
29. http://www.economist.com/blogs/freeexchange/2010/03/volcker_recession.
30. Bauman, *Liquid Modernity*, 58. It should be noted that David Harvey has explored this terrain with equal energy and insight, though here I do not rely on his approaches. Key texts include: *A Brief History of Neoliberalism*; *The Enigma of Capital*; and *Seventeen Contradictions and the End of Capitalism*.
31. Bauman, *Liquid Modernity*, 25, 47, 115.
32. Nasaw, *Andrew Carnegie*, 580–585; Hounshell and Smith, *Science and Corporate Strategy*.
33. Bauman, *Liquid Modernity*, 13–14. Here the products referenced are consumer, not capital, goods.
34. Ibid., 150–151.
35. In the US, the late 70s crushing inflation, followed by the Volker recession and an epic credit crunch destabilized an increasingly inflexible production system, validating liquidity as a core competence and triggering spatial dislocations that destroyed much of the nation's manufacturing, heavy and consumer industries alike. See Cowie, *Stayin' Alive*; Judith Stein, *Pivotal Decade*. For machine tool examples, see Scranton, "A Rocky Road to Globalization."
36. Bauman, "Liquid Modernity: A Lecture."

37. Ibid., 6–7 (emphasis added). Though there is not room here to detail the resonances, Bauman's approach resonates with the wide-ranging analysis of post-1970 management perspectives in Boltanski and Chiapello, *The New Spirit of Capitalism*. For example, they argue that "Henceforth people will not make a career but will pass from one project to another, their success on a given process allowing them access to different, more interesting projects." (*New Spirit*, 93.) It's not clear this optimism is justified, however.
38. Bauman, *Identity*.
39. For an analogous, but differently constituted spectrum, see Modig, "A continuum of organizations."
40. Projects also operate on different *spatial* scales, ranging from local (inside firms, building sites) and regional (road systems, power grids), to national/international (NASA missions, creating Eurostar trains or the Chunnel) and transnational (drafting/sorting radio frequency spectra or devising European air traffic control), to indeterminate and distanciated (interfirm project teams, online ticketing) and fully placeless (Wikipedia and open source software development). Integrating spatiality with variants of form and scope is a task ahead.
41. Epstein, *Torpedo.*
42. See, on "The Pill" (oral contraception), Marsh and Ronner, *The Fertility Doctor*. Here an heir to the McCormick (reaper) family fortune personally funded research no established foundation would touch.
43. Cook, *European Air Traffic Management*.
44. The issue of exhibitions captures another dimension of organizations focused on projects. To the extent that these performances become routinized (as with Hollywood B movies of the 1930s/40s), they fall on the right-hand end of the project spectrum, being unimaginative, standardized, and repetitive, *even though* individually they select topics, scripts, audiences, and have budgets, project staff, and space/time allocations from central administrations. The difference independent film-making has made to the "studio" system is profound; a very rough analogy is exemplified by public art/performances and in a more interior way by museums inviting "guest curators" to bring fresh ideas and approaches to their interpretive projects.
45. Flyvbjerg et al., *Megaprojects and Risk*. For a creative rethinking of construction projects, see Bertelsen and Koskela, "Construction Beyond Lean." Crucially these authors argue that "project management must perceive the project as a complex, dynamic phenomenon in a complex, non-linear setting." (7).
46. See e.g. Keller, *Stone and Webster*, and Applebaum, *Royal Blue*, esp. Ch. 1, "The Thousand Yard Pour." NASA served this general contractor role, as well, as did many US military agencies. For PM perspectives, see van Donk and Molloy, "From organizing as projects to projects as organizations"; and for France, Godier and Tapie, "The Contemporary French Model".
47. Ramo, *The Business of Science*, 41–77. See also, Dyer, *TRW*.
48. Rogers and Larsen, "Winning at the Game: Intel and Silicon Valley Fever".
49. Lewis, *The New New Thing*. For the genealogy of the Fairchild Semiconductor spinoffs, see "Fairchild's Offspring." For a critique of this dynamic, see Florida, *The Rise of the Creative Class*.
50. Cassidy, *dot.con*; J. David Kuo, *dot.bomb*; and Michael Wolff, *Burn Rate*.
51. Wright et al., "Serial Entrepreneurs." See also Paul Gompers et al., "Skill vs. Luck." The vogue for venture capital support of high-tech startups makes it appear that serial entrepreneurs (regarded as more likely to succeed than novice entrepreneurs) began appearing only in the 1980s. I think this dubious, but have not found research to flesh out that suspicion. Firms as projects are, I think, distinctive from efforts to corner financial markets, but they may be evident in early twentieth century promoters/boosters who created local banks, for example, in newly settled regions, sold out and moved on. For suggestive thoughts, see Petrick, "Parading as Millionaires."
52. Indeed, an international group of construction history researchers, based in the UK, has sponsored an annual journal (*Construction History*) for nearly a quarter century. Their interests focus chiefly on architecture and preservation, however. Construction research also can benefit from a broad range of technical and trade journals, which date to the second half of the nineteenth century.
53. Many of these were classified, but have gradually been opened to researchers. All I believe have been microfilmed. See Neufeld, *United States Air Force History: A guide*, which lists over 1500 studies from the USAF history program.

54. Marschak, "The Role of Project Histories in the Study of R&D," 3, 15–18. Many classic RAND studies are available for purchase or download at: http://www.rand.org/publications/aboutpub.html.
55. Sapolsky, *The Polaris System Development*. Given secrecy requirements, Sapolsky identified his military and industry informants only with code numbers.
56. General Electric Company, *J79 Project History, Vol. II*, ii.
57. An important resource for the dot.com era, however, has been created by David Kirsch at the University of Maryland, with funding from the Sloan Foundation. The Dot.Com Archive gathers business plans, correspondence, personal accounts and other documentation about defunct firms started during the Internet's first generation. See http://www.businessplanarchive.org/ and http://www.dotcomarchive.org/.
58. A theoretically assertive collection of new perspectives is: Hodgson and Cicmil, eds., *Making Projects Critical*. See especially the challenging "Afterword" by Peter Morris, 335–347.
59. Soderlund, "Building theories of project management: past research"; Cicmil et al., "Rethinking Project Management."
60. See Perminova et al., "Defining Uncertainty in Projects"; Geraldi et al., "The Titanic sunk, so what?"; Pich, "On Uncertainty, Ambiguity, and Complexity in Project Management"; Atkinson et al., "Fundamental uncertainties in projects." For an auto industry-focused assessment, see Lenfle, "Exploration and project management."
61. Lundin and Soderholm, "Conceptualising a projectified society"; Maylor et al., "From projectification to programmification"; Midler, "Projectification of the firm" (n19).
62. Epstein, *Torpedo*.
63. As a starting point, see Garel, "Pour une histoire de la gestion de projet".

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