



MoMA, THE MUSEUM OF MODERN ART, NEW YORK

NEW YORK, NY

EXECUTIVE SUMMARY

The purpose of this case study is to examine 1) what different roles the design architect and the executive architect play on this project, 2) how the design team was structured to ensure that Taniguchi's design character could emerge in the US, and 3) how information technology opened up the possibility of distance collaboration.

Project definition

owner:	The Museum of Modern Art (institutional project)
building use:	gallery, office, research space, education facility, movie theater, library, design and book store, restaurant, sculpture garden
building type:	new construction/renovation of existing building
size:	630,000 square feet
gallery space:	125,000 square feet (projected)
construction cost:	\$250 million ¹ (\$ 397/sf)
project cost:	\$800 million ² (including MoMA QNS ³)
design architect:	Yoshio Taniguchi, Taniguchi and Associates (TA), Tokyo, Japan
associate architect:	Kohn Pedersen Fox Associates (KPF), New York, NY
project delivery method:	CM-at-risk (fast-track)
design period:	December 1997 –
construction period:	Spring 2001 – Winter 2004-2005



Figure 1:
model of MoMA viewed
from Fifty-fourth Street
Source: The Museum of
Modern Art, New York

At its December 8, 1997, meeting, the Board of Trustees appointed Yoshio Taniguchi as the architect of an expanded Museum of Modern Art, reconceived to meet the needs of the institution and its broad public in the twenty-first century.⁴ Well known in Japan as a designer of museums, Taniguchi has completed several in recent years, including Ken Domon Museum of Photography (1983), Higashiyama Kaii Gallery in Nagano (1990), Marugame Genichiro-Inokuma Museum of Contemporary Art (1991), and Toyota Municipal Museum of Art (1995). His design is also noted for

¹ Source: MoMA.

² Source: *ibid.*

³ MoMA's temporary gallery space in Long Island City, Queens, NY.

⁴ Source: *Imagining the Future of The Museum of Modern Art*, p. 11.

Shiro Matsushima, Doctor of Design, prepared this case under the supervision of Professor Spiro Pollalis as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

its preciseness and modernist sensitivity that came out of the mixture of Japanese tradition and his education in the US at Harvard.

Taniguchi was selected through a two-part selection process. Out of ten architects who participated in the charette process, the Architect Selection Committee selected him as one of the three finalists to participate in the architectural competition, along with Herzog and de Meuron and Bernard Tschumi. This was his first design competition, his first international commission, and his largest institutional building. He is known by his precise design that evolves through control of the design throughout the course of construction, which is made possible by the Japanese construction process. While Taniguchi wanted to open a branch office in New York exclusively for this project to allow direct control, MoMA required him to collaborate with a local firm and assigned a New York firm, Kohn Pedersen Fox Associates (hereafter KPF), as the executive architect.

The design architect had to face some key issues:

- devising the world's leading museum of modern art,
- managing his first project outside Japan,
- working in a different culture and with a different construction process,
- managing the diverse needs of the owner/user groups,
- ensuring feasibility during the design phases,
- transferring the design information accurately to the construction documents.

Located in the heart of Manhattan, MoMA has long been a leading institution of modern art and particularly has had an impact on the modern architecture movement. Therefore, the project would have to draw attention to the world of art and architecture. In addition, the construction process in the US is quite different from that in Japan. Manhattan, in particular, is a special place where construction is very difficult. Moreover, it was assumed that the ordinary production quality in New York would not meet the conditions needed to realize Taniguchi's design quality. The entire team looked for a way to materialize his design.

First of all, Taniguchi asked to be paired with a designer, not simply a production office unless he could open a branch office in New York. KPF was selected to meet his request, and qualified consultants were also assigned. As opposed to the conventional executive architect model, KPF was involved in the design work early on in the process. During the schematic design, they provided Taniguchi's office with information mainly about code issues and the construction industry; in the design development phase, they dispatched staff members to Taniguchi's office in Tokyo. The staff had essentially two missions: the first was to ensure feasibility by inputting local information and coordinating with consultants in the US; and the second was to specifically develop the curtain wall design. Because of the challenge of designing a curtain wall given the building's location, the local firm KPF took the lead on this, with continuous design input from Taniguchi. Eventually the team chose Permasteelisa/Gartner, an Italian building envelope manufacturer, to build the curtain wall. The placing of KPF staff in Taniguchi's office was beneficial for the two architectural firms in building trust. At the same time, KPF was able to understand the architectural style and the goals of Taniguchi and to have sympathy for them.

The design team also had to manage the distance-related problems. Taniguchi likened himself to an orchestra conductor, and he needed close contact with all involved parties. While direct contact still remained essential, some information technology tools such as extranet and teleconferencing were adopted.

This case study will examine an executive architect model that is more collaborative than the ordinary hierarchical executive architect model. Contractually, the relationship was a conventional one. However, to achieve the goals of the Museum through Taniguchi's design, MoMA did not think that the ordinary process would produce the best result. This case study will describe how the special arrangements were done. In addition, it discusses how information technology is used for this distant collaboration project, and what skills are needed for the architects in this kind of project.

As Terence Riley, chief curator of MoMA's Department of Architecture and Design, remarked, "The project that wishes to achieve more-than-ordinary results must accept more-than-ordinary conditions for success." While Taniguchi has had fewer opportunities to participate in the project, particularly in the latter phases of the design because KPF took over construction documents and construction administration, he can oversee the construction process, unlike Cesar Pelli when he did the MoMA expansion project in the 1980s. For KPF, although they have been sometimes frustrated with the go-between role, their knowledge about the construction process in New York and their proximity to the venue and the client have facilitated the project. More importantly, their admiration of Taniguchi and willingness to learn about museum architecture are very important factors for successful collaboration.

In terms of the distance, although the team employed an extranet in order to improve communication and coordination, because of its inability to handle a huge amount of data the team gave up using it. Teleconferencing has been used to supplement travel, but direct contact has still remained essential. The asymmetry of information problem has not been completely resolved. In addition, several points emerged regarding the executive architect model: increased coordination is required for delivering key design decisions; and the process for identification of key design issues becomes less clear.

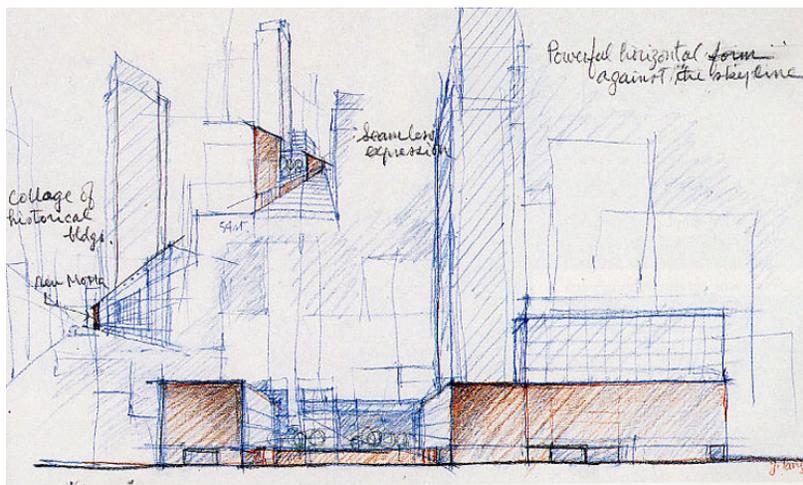


Figure 2: Perspective sketch by Taniguchi for charette
Source: *Imagining the Future of the Museum of Modern Art*

Taniguchi has rarely discussed in print the philosophy and method behind his design, preferring instead to offer terse, quite sachlich explanations concerning just-completed works.

Fumihiko Maki⁵

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PROJECT OUTLINE

Founded in 1929, the Museum of Modern Art has consistently exhibited art that challenges ideas and alters perceptions. Throughout its history, the Museum has enriched generations of visitors and students from all over the world. The Museum must now improve, enlarge, and strengthen its mission. MoMA is building greater and more flexible spaces to display its collection, build closer relationships with students, and offer the public an enhanced educational experience. The new Museum will continue to occupy its current address—11 West 53 Street—but, with approximately

⁵ The Japan Architect, *Yoshio Taniguchi*, p. 4

630,000 square feet of space and the ability to accommodate 2.5 million visitors and 600,000 students every year,—it will have almost doubled the capacity of its current facility.

The beginning of construction in the summer of 2000 marked the end of a four-year planning phase that began in February 1996 with the acquisition of the Dorset Hotel and several smaller properties. These new properties made it possible for MoMA to expand its footprint significantly to the north and west. After an extensive worldwide search in which the Museum invited ten firms to submit preliminary plans, Yoshio Taniguchi was chosen as the architect for the new Museum. Taniguchi's submission was selected for its elegance and clarity as well as sensitivity to light and space. The New York firm Kohn Pedersen Fox Associates PC is serving as executive architect to bring Taniguchi's design to fruition.

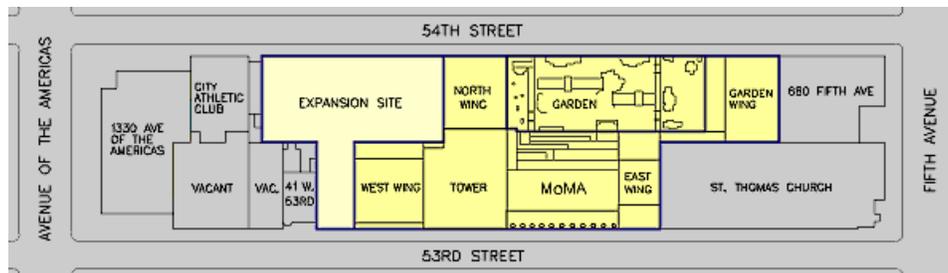


Figure 3: MoMA site at 11 West 53 Street

Source: MoMA Builds web site

Charette and competition⁶

The Architect Selection Committee, chaired by Sid R. Bass, vice chairman of the Board of Trustees of MoMA (see figure 8.2.19 for people and tasks), selected ten architects on January 9, 1997 and invited them to charette. This workshop for the architects was held at the Museum from February 17 to 19, 1997. Each architect was urged to generate multiple proposals and responses to the designated requirements, and each was asked to document his thought through sketches, drawings, plans, and a written statement. At the end of the final day of the workshop, the participants were given an 11-by-17-by-3-inch green solander-like box in which to submit their charettes, which were due on March 24, 1997. The only stipulation to the architects about their submissions was that they had to fit within the charette box.

On April 7 and 8, 1997, the Architect Selection Committee met to decide which of the ten architects should be invited to participate in the limited competition. Three architects, Herzog and de Meuron, Taniguchi, and Tschumi, were chosen on the merits of the first charette and the degree to which they had met the criteria established by the selection committee. The three finalists were announced to the Board of Trustees at the April 9 meeting of the board.

Herzog and de Meuron, Taniguchi, and Tschumi returned to the Museum on June 4-6, 1997, for a briefing on the architectural competition. This briefing included a review and discussion of all of the charette submissions, a meeting with the chief curators, the senior staff, and the Architect Selection Committee and its advisors, as well as an extensive tour of the Museum. Members of the staff of Cooper, Robertson and Partners, program architect, who worked closely with Karen Davidson, Assistant Director for Policy and Strategic Planning at the Museum, for needs definition, were available to answer questions about the site, its existing conditions, and zoning restraints. In the charette, the committee had decided to relax the zoning restrictions to allow architects to consider merging lots and redistributing the mass of the expanded building across the entire site. However, in the competition the architects were required to work within the existing constraints. In addition, although the architects had not been asked to work to a budget in the charette, they were given a maximum budget figure of \$150 million for the architectural competition.

⁶ For detail of the architect selection process, refer to *Imagining the Future of The Museum of Modern Art*.

In the summer of 1997, William Maloney, project director for the expansion, Glenn D. Lowry, director of the Museum, and Terence Riley traveled to each of the architects' offices for a midcourse review so that the architects could ask queries and get answers before finishing up their submissions. The last stage of the architect selection process began on September 26, 1997, when the three architects submitted their proposals to the Museum. These were immediately sent out for two forms of review. Wolf and Company carried out the review of their compliance with the given budget, and Cooper, Robertson and Partners carried out the review involving other aspects of the competition program. The Architect Selection Committee then met beginning December 2, 1997. After an intense review of the submissions, the committee unanimously recommended the appointment of Yoshio Taniguchi as the architect of the Museum expansion. The Board of Trustees confirmed this recommendation at its December 8 meeting, and on that day, a public announcement of the architect was made.

Artifact design⁷

Yoshio Taniguchi's design for the new Museum is an inspired response to MoMA's complex needs and urban site. It presents an elegant interplay of stone, metal, and glass in which new spaces combine with the original architecture to form a cohesive whole. For the first time, the Museum will have a Gallery Building capable of showcasing both large contemporary artworks and modern masterpieces, and a facility dedicated solely to educational and research activities.



Figure 4: Fifty-third Street façade (February 2003):
Taniguchi's addition in the background enhances horizontal continuity
Photo: author

Along Fifty-third Street, a new building joins MoMA's collection of façades to form an architectural collage that links the Museum's past with its future. Philip Johnson's 1964 East Wing is maintained, with the building now incorporating a new staff entrance and offices, and Cesar Pelli's 1984

⁷ Source: MoMA Builds web site.

Museum Tower becomes a more integral part of MoMA's design. The new Gallery Building is situated west of the Museum Tower entrance and joins the continuum of existing façades. White fritted glass and ceramic panels demarcating the new Fifty-third Street entrance and a gray glass curtain wall echo the Fifty-fourth Street façade.



Figure 5: Model for the new Museum, view from Fifty-fourth Street:
two wings facing the Sculpture Garden

Source: The Museum of Modern Art, New York, photo by Jock Pottle

An entirely new facade is created on Fifty-fourth Street. Two new buildings—the Gallery Building housing the main exhibition galleries, and the second housing the Museum's first stand-alone Education and Research Center—reflect MoMA's dual priorities of art and education. Mirroring one another, the two buildings frame the enlarged Abby Aldrich Rockefeller Sculpture Garden. Taniguchi maintains the repose of the quieter Fifty-fourth street side by placing the galleries and a new entrance on this semi-residential block and concentrating the theaters, restaurant, and museum store on Fifty-third Street.



Figure 6: computer-generated image of the Sculpture Garden and gallery lobby

Source: Taniguchi and Associates

The new Museum takes full advantage of the Sculpture Garden, preserving Johnson's 1953 design and extending this urban oasis into the Museum along the east, west, and south façades. Taniguchi also reestablishes the Southern Terrace, an essential part of Johnson's enlargement of the Sculpture Garden in 1964. Views of the Garden are available from every entrance to the Museum and from both the Gallery Building and the Education and Research Center. The relationship between the Museum's interior spaces and the Garden is enhanced, with the Garden regaining its original place as the heart of the Museum.

The gallery lobby, with a light-filled space soaring 110 feet, links Fifty-third and Fifty-fourth Streets. Here Taniguchi incorporates the midtown context, taking the ideas of the street and promenade and transferring them inside. This interior avenue serves as the information spine of the Museum, containing ticket counters and information about membership, current exhibitions, and programs, and access to the Museum's restaurant, theaters, and bookstore/design store. Visitors can veer off this avenue to enter either the Museum or the museum store.

The lobby has extensive views of the Sculpture Garden and provides access to a grand staircase that rises to the second level. As a result, the large public spaces of the main lobby, with its thirty-foot-high ceiling, flow into the large collection of galleries dedicated to recent work. An atrium soars to a height of 110 feet from the large contemporary gallery on the second floor.

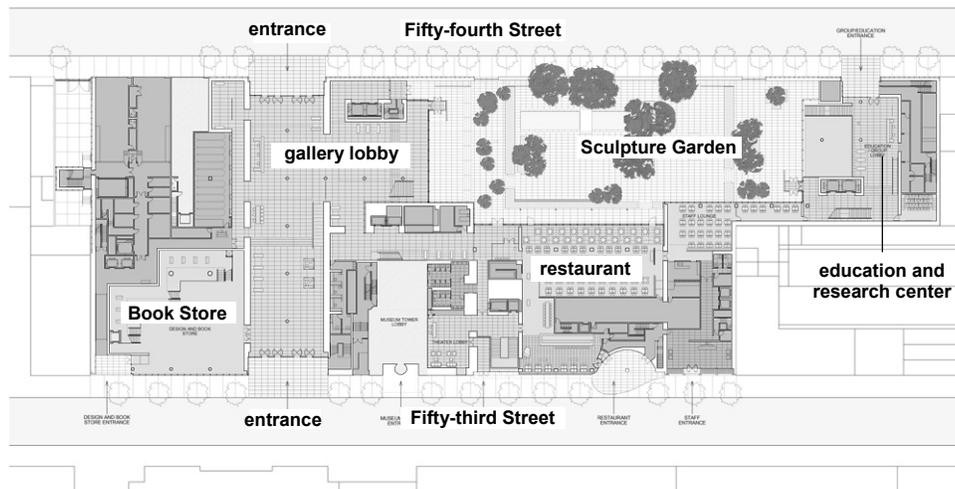


Figure 7: First-floor plan (March 2001)
Source: Taniguchi and Associates

PROJECT TEAM STRUCTURING

Owner—MoMA

Under the Board of Trustees, Glenn D. Lowry, director of the Museum, organizes the six department heads and their staff members for the meetings with the architect. The facilities staff members led by William Maloney, project director, and Jean Solomon, project manager, manage the project. Terence Riley, chief curator of the Department of Architecture and Design, plays an important role in decisions regarding design issues (see Exhibit B for people and tasks).

Among the many goals set for the project by the Board of Trustees was the stimulation of discussion among various audiences about the future roles of museums of modern art, and how architecture can contribute to fulfilling those roles. The Museum therefore convened a weekend retreat at the Pocantico Conference Center of the Rockefeller Brothers Fund from October 4 to 6, 1996. Participants at the conference included the Museum's seven chief curators, various museum directors, critics, scholars, artists, and architects, and the trustees on the Architect Selection Committee. The theme of the conference was "Building the Future: Museums of Modern Art in the

Twenty-first Century,” and the discussions were organized around four conversations, each designed to raise a group of related questions about art, architecture, and museums of modern art. This led to the creation of a common set of goals for the project among the Museum’s senior curators, staff, and trustees.

At roughly the same time that this initiative was being carried out, the Museum embarked on a detailed needs analysis. Cooper, Robertson and Partners, an architectural firm with extensive planning experience, conducted the analysis under the direction of Alex Cooper. Karen Davidson coordinated and oversaw the project. In order to ensure that the expansion would accommodate the anticipated needs, each department was asked to outline its current requirements; its needs for the year 2005, the projected completion date for the expansion; and its anticipated needs for the year 2025. Then questionnaires were prepared by Cooper Robertson in conjunction with the chief curators and senior staff of the Museum and individual departmental interviews were conducted by Cooper Robertson. The process of conducting the needs analysis became a way of rethinking the organization of the Museum, its physical layout, and its particular requirements for the next twenty to thirty years. The results of the analysis were indispensable in shaping the design program given to the architects during the two-part selection process.

Yoshio Taniguchi

Born in 1937, Yoshio Taniguchi is well known in his native Japan for his uniquely beautiful museums of modern art. These include: Nagano Prefectural Museum (1990); Marugame Genichiro-Inokuma Museum of Contemporary Art (1988-1991); Toyota Municipal Museum of Art (1991-1995); and the Tokyo National Museum, The Gallery of the Horyuji Treasures (1994-1999). After graduating from the Keio University of Japan with a mechanical engineering degree in 1960, Taniguchi went on to Harvard Design School, where he received a true architectural education. He is one of the first Japanese architects of the postwar generation to receive their architectural education outside Japan. As a son of Yoshiro Taniguchi (1904-1979), however, an architect who specialized in both traditional and European modern architecture, he was exposed from an early age to architecture.

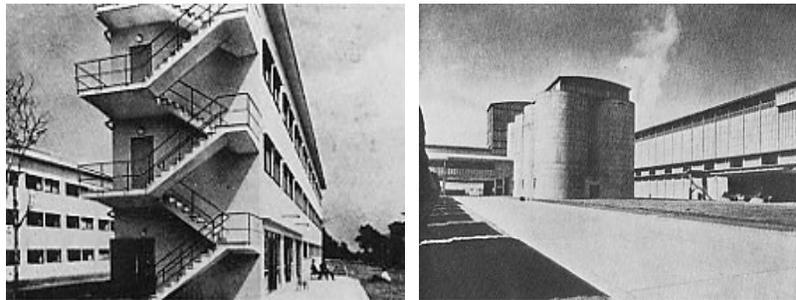


Figure 8: Works of Yoshiro Taniguchi:
(left) Keio Hiyoshi campus, 1938, (right) Chichibu Cement plant, 1956

Source: *Modern Architectural Graphics*

This was his first design competition and his first international commission. Taniguchi says that he always tries to interact with society only through built architecture. “For me, the built architecture is the one and only. Because I can’t have the reality with architecture that is not guaranteed to be built, I can’t commit myself to the design. That’s why I haven’t participated in design competitions.”⁸ Therefore, MoMA is an exceptional project for him. He is known to the design community by his sensitive design and precise detailing. To maintain the quality of his architecture, he has decided not to expand the number of his projects and has kept his office relatively small so that he can control every aspect of the design.

⁸ *Shin Kenchiku*, May 2001.



Figure 9: Recent works of Yoshio Taniguchi:
Toyota Museum, Aichi, Japan, 1995 (left), Gallery of Horyuji Treasures, Tokyo, Japan, 1999
Source: The Gallery of Horyuji Treasures



Figure 10:
Taniguchi (left) in his studio meeting with Aamoht (center)
Source: MoMA Builds web site

Besides his partner, architect Shinsuke Takamiya, key staff members of the project are Koji Ogawa and Brian Aamoht. Ogawa was a partner of Taniguchi for over 20 years. He specializes in museum design and is serving as the chief architect of the MoMA project. Although he left the firm about ten years ago, Taniguchi asked him to collaborate for the museum project. In addition, Ogawa is leading the firm's digitalization, introducing Macintosh and CAD software. Aamoht joined the firm after he graduated from Harvard Design School with an MArch degree in 1988. He played a coordination role between Japan and the US.⁹

In his projects, Taniguchi makes the most of Japanese design and a construction context where design can evolve through the entire process, including the construction administration. Working closely with the production side, his precise design comes to fruition. He has someone who intervenes on site and tries to directly change things as they have been developed. For the MoMA project, he also intended to carry out a direct operation including construction administration and tried to acquire an architectural license in New York State. However, the Museum wanted to have an executive architect who would produce construction documents and carry out construction administration. They assigned KPF along with other engineers and consultants. "They seem to think that jobs such as construction administration should not be the work of the design architect," said Ogawa.¹⁰

Executive architect—KPF

With a high design profile, Kohn Pedersen Fox Associates had had diverse experience in the US market and was expected to provide local information to Taniguchi's office from the outset of the design process. Stephen Rustow was assigned as project manager of KPF's MoMA team with his rich knowledge of museum design, along with his colleague, Thomas Holzmann. Rustow was an original member of I. M. Pei's Grand Louvre project in Paris. Having an executive architect necessarily creates some tension between the design architect and the owner. Rustow talked with Taniguchi's office about the role of their firm: "I talked with Brian Aamoht, I suggested that Taniguchi should think seriously about ... the control of the documents, the possibility to revise the project as a function of either technical, budget, or programmatic changes all the way through the process and construction supervision." Then they set up the overall scope of work. In this case, however, unlike in Pelli's case, both the owner and KPF thought that Taniguchi's involvement in the later phases of the project would be necessary to materialize his design precisely.

This was the first project in which KPF worked for another architect. Besides being interested in the exposure to an important client (MoMA), KPF was interested in working on a museum project, for which they had less expertise.

⁹ Aamoht left Taniguchi's office in January 2003.

¹⁰ Cesar Pelli did not do construction administration at all in his work at MoMA in the 1980s. The glass-enclosed garden hall was slightly revised after Pelli left the project.

	MoMA, CR+P	TA	KPF
programming	M		
conceptual design		100	
schematic design		80	20* ¹
		(for curtain wall, see table 8.2.2)	
design development		80	20* ¹
	(for reprogramming at design development, see table 8.2.3)		
construction documents		5* ²	95
construction administration		5* ²	95
		E: equal M: major m: minor	

*¹ KPF played only a coordination role with local structural and mechanical engineers.

*² mainly to check construction documents and shop drawings.

Table 1: Original scope of work for MoMA

Source: interview with Koji Ogawa in March 2001, email interview with Junko Imamura in February 2003

Use of information technology

Although Taniguchi was at first skeptical about using computers in the project, eventually information technology (IT) played important roles, both in the competition phase and the following design stage. As Taniguchi first wanted to design the MoMA project all by hand instead of using computers, the firm's introduction of IT tools was quite recent. Although Ogawa had introduced CAD previously, Taniguchi and his partner Takamiya were reluctant to introduce digital tools.

The situation changed during the competition phase of the MoMA project. Taniguchi began to recognize the efficiency of the use of IT in the first stage. "In the second stage, when he saw that I quickly made the model of the existing tower by mapping the façades that I generated by computer, he changed, I think," Ogawa recalled. Then CAD and digital graphic tools were used for the second stage of the competition. MiniCAD was used for drafting and the data was transformed to form-Z for 3D modeling. Photoshop and Illustrator were used for retouching and desktop publishing (DTP). They made the most of the digital tools in the second stage.

However, after he was named the winner of the competition, Taniguchi wanted to return to working by hand. MoMA, however, required the architects to use digital data for better communication. Due to the owner's preference, Taniguchi was forced to consider the introduction of computer systems. Once decided, he, as a signature designer, committed himself to searching for the right system for three months. The result was Macintosh; he observed that many design-savvy people prefer Macintosh. However, KPF's system was MicroStation. Taniguchi was inevitably required to use MicroStation on PCs. Citadon was employed as a coordination tool so that the owner could track every process of the project.

CAD MicroStation. Number of drawings was approximately 600. KPF NY office uses PCs by Dell and uses the specialized rendering software, Bentley Masterpiece, for presentation drawings.¹¹

Coordination Tools

Email and extranet: ProjectNet (later Citadon).

¹¹ Phiri, pp. 151-152.

COLLABORATIVE PROCESS

As described above, Taniguchi usually commits himself to changing the design even in the production phase. He alone can balance the cost and quality of design. The American system of competitive bidding is absolutely antithetical to Taniguchi's method. Here it is the architect's responsibility, with the help of consultants, to create a package of drawings in which all of the tradeoffs and all of the complicated equations have been anticipated so that later, when there is a problem or the architect thinks something should be changed, he can refer to an alternative for which there was already a bid. However, in order to do this, the architect must prepare drawings and specifications. In addition, it is a constant struggle for the architect to stay on top of the construction manager to see that the construction manager does not make change-order decisions.

Design development

So for the architects, what were the problems? First of all, Taniguchi's office was not going to be in New York after schematic design. At that point the office would return to Tokyo and Brian Aamoth would become the go-between. They would not be in New York with a full office for the elaboration of the program, and they could not be there for the development of the documents. Therefore, it was clear that KPF had to provide a great deal of information to Taniguchi about the New York architectural climate. At the same time, Taniguchi's office had to share design information with KPF. Even with schematic documents in hand, KPF would surely have questions about design development. "When I started on the project with Thomas Holzmann in July 1999, we spent a great deal of time putting together a consulting team, a great deal of time providing information, and a great deal of time continuing interaction with the Museum because it was very hard to do from Tokyo," said Rustow. "Obviously key people from Tokyo would come to New York; we would also travel to Tokyo, ten trips in fourteen months. We had staff in Tokyo; we insisted that somebody from our office be in Tokyo for the entire schematic design phase." They sent Brian Girard¹² to Tokyo for sixteen months to help in design development.

Curtain wall

In particular, the curtain wall was an important element for Taniguchi's design, but it seemed hard to achieve the same quality in the US as in Japan. KPF created an eight-person team in Tokyo for about six months, which included Brian Girard. "The reason for that was very simple; neither Kajima nor Takenaka¹³ was on this job," said Rustow. And Taniguchi's office needed some assistance to create a set of technical documents according to US standards that they could use for design development. Taniguchi's strategy in Japan is to store his knowledge about design and implementation in the construction partners, and he has been able to develop his ideas through direct interaction with these people. At the outset, Taniguchi was looking for a way to carry out this process in the US and was exploring how to get a New York State architectural license. However, the difficulty was that he did not have the technical expertise inside his office to document the curtain wall (though obviously he could have consultants for it). Because the curtain wall construction would go to international bidding, the architects needed to make a biddable set of documents for the international market. KPF played a comprehensive role in preparing the documents. The architects were looking at YKK/Cupples, Permasteelisa, and Josef Gartner. Just as they were bidding, Permasteelisa and Gartner merged. From the outset, because the curtain wall was obviously going to be one of the most difficult and prestigious parts of the project and the most complicated one to coordinate, KPF explained to the Museum how they would construct the curtain wall. That was before AMEC, the general contractor, was involved. KPF and Taniguchi's office together described the key to their approach: KPF would work directly with Taniguchi beginning with schematic design. Actually, the partnership started even before schematic design because while Taniguchi's office was working on schematic drawings, Holzmann and Rustow were already traveling to Japan to give them some information. Rustow has a great deal of experience in museums and Holzmann, who had been with KPF for about fifteen years, has a great deal of

¹² MArch '94, Harvard Design School. He joined KPF after a three-year practice at Pei's office.

¹³ Two of Japan's five major general contractors.



Figure 11: curtain wall and cladding was an important but difficult element:
gallery wing view from the Sculpture Garden

Source: Taniguchi and Associates

experience in curtain walls. Bob Heingtes, who used to be in Pei's office, was the curtain wall consultant. The issues related to the curtain wall had to do with everything: the nature of the glass, vapor barrier, assemblage, and so forth. The idea was to document all of those at the outset so that the set of details they controlled could be realistically taken over by a curtain wall manufacturer and developed in a way they knew would work. "Because if you simply submit drawings which haven't been worked through, they might say, 'This, well, is fine, but we have to do that our way.' You would lose the control of the process," said Rustow. "So for the curtain wall, it was absolutely clear that the only way to have Taniguchi's office seriously participate in the process which would control the construction was for us, with our knowledge of curtain walls, to put a team at his office in Japan."

Therefore, in Taniguchi's office on the eighth floor, which was rented exclusively for the MoMA project above their original seventh floor, seven people from KPF were sitting there drawing the curtain wall drawings to KPF standards with Taniguchi's constant input. KPF did a great deal of modeling for Taniguchi and drew many alternatives with corresponding models. Taniguchi's office had several gifted model makers. However, KPF developed a three-dimensional computer model, which allowed him to look at things in a very different way. "And that was really wonderful collaboration. Tom and I were supervising the group of people over there. So we would take turns going over in a month; I would say each of us was there for about ten days a month. We would cover three weeks then, we could do that often. That went on about ten months. It was by no means easy, but the result was a very strong package of drawings so that when the construction manager came on, the drawings could be essentially bid as they had been developed directly," said Rustow.

Finally, they were able to have a negotiated bid with just one group because YKK/Cupples said that they could not come to the US in that time frame. It was apparently a commercial decision because YKK was not happy that Cupples wanted to take the lead. Although the architects were talking a great deal with Phillip Bonzon,¹⁴ at the last minute he said, "No, we can't do it." That left the architects with Permasteelisa and Gartner, and they announced that they had combined forces, so they had no competition. What the architects had to do was to see if they could, without the complete documents, negotiate a price with Permasteelisa/Gartner. Permasteelisa/Gartner was very intrigued to do the work because Gartner had never built in the US and Permasteelisa had seldom done so; this would be their first job in New York, and it would be only the third US job for

¹⁴ Curtain wall designer for the Hongkong and Shanghai Bank by Norman Foster and for the MIT Media Lab expansion by Fumihiko Maki.

Permasteelisa. With the engineering effort of KPF, Taniguchi carefully studied the visual effect of the curtain wall. He made sure that the sets of joints, the set of proportions of the materials (such that the difference between a quarter of an inch and one eighth of an inch was carefully studied), were in keeping with his original design concepts, and he would evaluate alternatives in terms of joints and gaskets.

	TA	KPF
design development	20	80
	(design and control)	
construction documents	5	95

Table 2: Scope of work 2: curtain wall

Source: interview with Stephen Rustow on June 3, 2002

Concrete, steel, plaster, stone

For the other trades the situation was a little bit different. Taniguchi's office was doing the design development drawings for other aspects of the building at the same time that KPF was doing construction documents for the curtain wall in Japan. Brian Girard was very critical in making the relay between Taniguchi's ideas about developing the design and American construction practice. For instance, working in concrete is extremely difficult in New York, and finding quality concrete is very difficult. There were many assumptions of Taniguchi's that could not be fulfilled. Another example is the quality of steel milling, which does not exist in the US. Therefore, very little exposed steel can be used. As a consequence, KPF had to develop very complicated aluminum cladding systems. There was a constant dialogue that did not intend to change Taniguchi's architecture but rather to find an interpretation that could be made with precision in the US. In the US, for instance, drywall is used more extensively than the old tradition of real plaster. "In France, for example, everything was real plaster. And you get a density of beauty of plaster surfaces which is very hard to achieve," said Rustow. Again, for the use of metal panels, which is absolutely exquisite in Japan, the architects were able to find and get Gartner, the German firm, to create metal panels for the interior as well. Until that happened, they were very concerned that the metal panels might not be produced by either a Japanese or a German company and that they would have a very poor American result because of the quality of tolerance, the bending, and so forth. In those early months in Japan, KPF served as a resource and also as a sort of advance control or editor to say, "Careful. If you develop it like this, it would be extremely difficult to get satisfactory results. But if we do the same thing like this, then there is a better chance." It would have been impossible for Taniguchi to know those tricks without KPF providing local knowledge. Had he established an office in New York, he would have liked to hire that expertise. "So in that respect, I think it was a complicated model for collaboration, but it was a good one," Rustow continued.

However, the real difficulty came in construction documents and construction administration. The Museum made the decision that Taniguchi would not be directly involved in construction supervision, and that put a very difficult responsibility on KPF. Because KPF is a design firm, this would be their first time serving as an executive architect.

Scope of work—unanticipated event

They had a comprehensive arrangement for scope of work (Table 1). However, the design development programming was completely redundant; a second design development phase happened at the end of the year 2000 because of a program change initiated by the owner.

While Cooper, Robertson and Partners carried out the original programming, KPF did the second round of design development programming. Therefore, the division of the scope of responsibility for the development of the new program in fact ended up being KPF 50+ and TA 50-.

	TA	KPF
design development	50-	50+
construction documents	5	95

Table 3: Scope of work 3: design development re-programming

Source: interview with Stephen Rustow on June 3, 2002

This 50/50 relationship was applicable to everything but the curtain wall and the gallery spaces, for which KPF took more responsibility. One example of KPF's greater responsibility is the design of the skylights on the galleries. Although they had been reduced compared to the original scheme (Figure 12), there was a lot of back and forth before they finally agreed to one small skylight. Taniguchi was always informed and a part of the process, but all of the day-to-day discussions had to be done by KPF with the owner and curators. It put KPF in a very complicated position, since KPF was a design firm. KPF had made a decision that this project was so exceptional and so interesting, and also represented a field of work, museum institutional work, in which they did not traditionally have strength, that they would take the secondary role as a way to develop experience. However, the relationship did not evolve that way. When he was asked to work with a local executive architect, Taniguchi said to the Museum, "I do not want to work with an executive architect who has no designer. I want to work with designers." He did not want to work with a firm that was simply going to say to the Museum, "Oh, if you want to change it, you can change it." He also said, "If the Museum cannot let me come to establish my own office, for whatever reason, I do not want to work with an executive architect who will take my work and draw it up. I need to work with somebody who will develop my ideas into documents." KPF also found themselves having to advocate for Taniguchi's design. When the Museum at one point eliminated the skylights, KPF, understanding Taniguchi's design intent, argued for six months with the Museum that it would not be good to eliminate all of the natural light. "They listened to us and finally they decided to put some skylights back in," Rustow said, commenting on one collaborative episode.



Figure 12: the temporary gallery originally was to have had a large skylight

Source: Taniguchi and Associates

There are many examples of that sort. Obviously, all of this is a result of conditions that Taniguchi could not have anticipated. The Museum essentially remade the entire program of the building starting at the end of year 2000, which was set to be the original completion time for design development. Taniguchi's design development was delivered in January 2001, and the final design development programming, done by KPF, was delivered in August 2001. Therefore, the acceptance of the program, which was supposed to illustrate Taniguchi's design development,

came six months after the original completion of design development. It implied that a large number of things would still have to change, and this all changed again after September 11. There was serious concern that they would not be able to continue with their projected budget. Even before September 11 there were cost overruns, leading to discussions about value engineering in which Taniguchi participated very closely. Due to uncertainty surrounding a fundraising process, they could not determine the comprehensive project budget. The consequence was that the architects were asked in October 2001 to look at dramatic changes to the budget which would necessitate not building some parts of the project, revising other parts, and renovating the existing building with less care. Although Taniguchi's office participated in all of the important decisions, the management of that process had to be done by KPF because they were close to the owner in New York.

KPF and Taniguchi

"During the design development, I think it is fair to say in terms of responsibility that it was shared in this sense; we refused to make any decision which Taniguchi could not endorse in terms of design. But we did at the Museum's request make studies of alternatives that Taniguchi did not originate," says Rustow. They were bringing alternatives to Taniguchi and then engaging in a conversation. Essentially, they would develop an idea together and go to the Museum. He continues, "So it was a shared responsibility because the actual production of the ideas often required a great deal of work by KPF, which Taniguchi was no longer in a position to do." Conversely, KPF refused, in some sense, to substitute itself for Taniguchi and said to the Museum, "We can't go that route unless we make sure that it would make sense with Taniguchi's design." They were not always comfortable because the relationship between the Museum and Taniguchi was sometimes strained. However, it has produced a design which is the clear result of Taniguchi's original idea. In that sense, KPF has played a design development role. People at KPF who are working on this project now understand the building very well, and if something has to be changed they are capable of interpreting the details in a way that makes sense with the rest of the project.

interests of the executive architect

Contractually KPF has the obligation to protect the owner. However, Rustow affirms that sympathy to Taniguchi and his design and protection of the owner go together. All of them are aware that this project is more important than any other project in New York right now, and it is an opportunity to do something about architecture in New York.

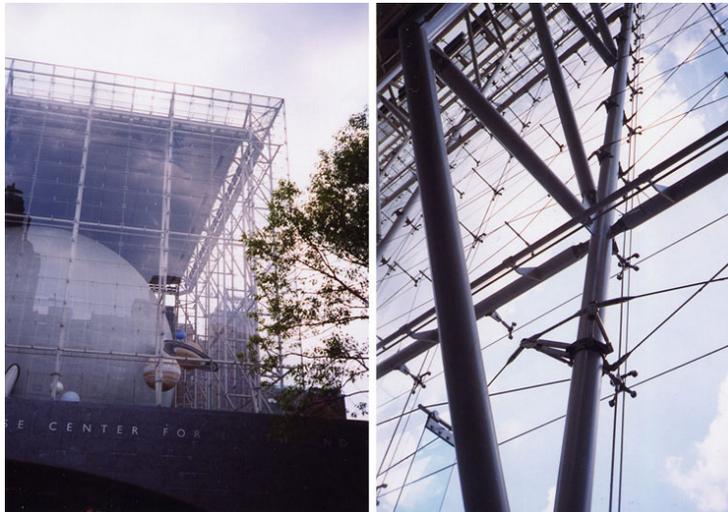


Figure 13: The Rose Center by Polshek: many floating figures in the interior space

Photo: author

There is, for the first time in a very long time, the possibility of making very simple and very elegant architecture at a standard that has not been seen in New York. James Polshek's planetarium within the Rose Center for Earth and Space of American Museum of Natural History (2000), was such an opportunity. In some ways, the exterior of that building became a new model for architects in New York that was never before seen in a public building of that size, scale, and scope. However, despite its extraordinary precision, the basic construction of the interior of the building lessens the quality of the overall building as compared to the graceful exterior. The MoMA is a very different building, but it is for a public institution, and it is right in the center of Manhattan. In some ways KPF, even more than Taniguchi, is very interested in everyone who participates in the architects' community such as Terence Riley. "All of us are working very hard to try to see that this becomes the public building that is clearly of a higher standard," said Rustow. He mentioned the Louvre in which he was involved. "In that respect, it is similar to the Louvre. Because the whole idea of the Grand Projects and of the Louvre in particular was to show the Parisians that something could be created in Paris at a higher standard than what preceded it. I think it was successful. ... The quality of construction and the way we put the team together were clearly above the level that the French had seen achieved in several generations." To do the same thing in New York is one of the driving forces for KPF to carry out the project, despite all the difficulties and frustrations. And from Taniguchi's perspective, it is certainly the largest project that he is likely to do outside of Japan.

FACILITATORS AND INHIBITORS

This chapter summarizes the major factors and mechanisms that have facilitated and inhibited the execution of the project. However, the following observations are mid-construction, so they must be considered tentative.

Executive architect model

There are pluses and minuses in terms of this executive architect model. KPF's experience with New York construction is the key to success throughout the process, including ULURP¹⁵ (Uniform Land Use Review Procedure for New York zoning ordinance), construction management methods, and permitting. Proximity to the client and the site is another advantage that ensures a rapid response to evolving conditions. It also enhances KPF's commitment, which is based on previous and future relationships with important clients. In addition, as Rustow mentioned, sympathy for the architectural style and goals of Yoshio Taniguchi goes together with their basic role to protect their client.

Minuses to this executive architect model include increased need for coordination in delivering key design decisions and a less clear process for identification of key design issues. It also limited Taniguchi's participation in evolving conditions. The somewhat frustrating situation for KPF is that, since they themselves are designers, it is very hard not to want to solve the problem in terms of design. Taniguchi has a way of working, and it was a very important exercise to find a way to support Taniguchi's way without taking it away from him. Because KPF is so much closer to the client and they see so much more clearly the everyday problems, it would be very easy to say, "Oh, we can do that. We can solve it." Instead, the project managers spent a lot of time saying to their people, "Let's prepare a couple of studies, a couple of options. Let's engage Taniguchi." It is really their obligation to keep this building Taniguchi's building. Otherwise, their effort does not make a lot of sense. On the other hand, they might just say, "Oh, Taniguchi has to solve it." But this does not work either. "What's interesting, but sometimes an inhibitor, is to put your design efforts and those of your team in the service of someone whose work you are not familiar with," said Rustow.

On the whole, despite some difficulties, this executive architect model has benefited the project. While having an executive architect necessarily creates some tension between the design architect and the client regarding implementation of their goals, "MoMA is very fortunate to have an executive architect with such a high design profile and such a high performance record," commented Terence Riley.

¹⁵ <http://www.nyc.gov/html/dcp/html/luproc/ulpro.html>

Having clear objectives

As a leading institution, MoMA seriously envisioned its future by first coming to an internal consensus. The collective efforts, represented by the Pocantico conference, facilitated institutional planning. This process was highly successful, as can be seen in the resolution of institutional goals in the final design.

However, at the macro level, there are some difficulties. Because the Museum is an institutional client, it does not always speak with one voice; the director does not have the luxury of evaluating decisions on his own. He must always refer either to the trustees, to the executive committees responsible for the budget, or finally to the donors. The donors often say, "I'd like to do something wonderful, but I want this to be like this. That has to be integrated into the project."

Communication

While there are multiple layers of voices, the owner has established rules to improve communication and coordination, thus allowing the in-house project managers to be the single point of contact between MoMA and the architects.

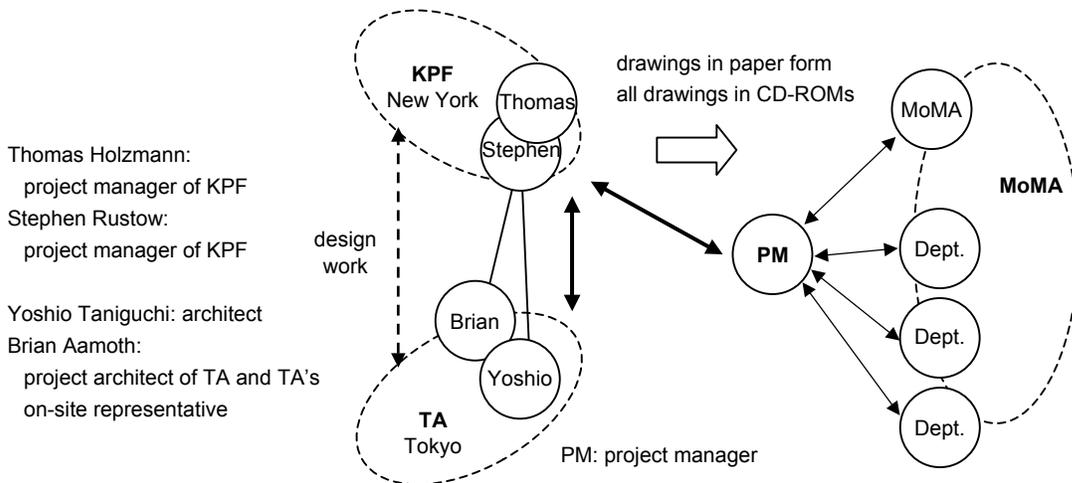


Figure 14: general formal communication protocol

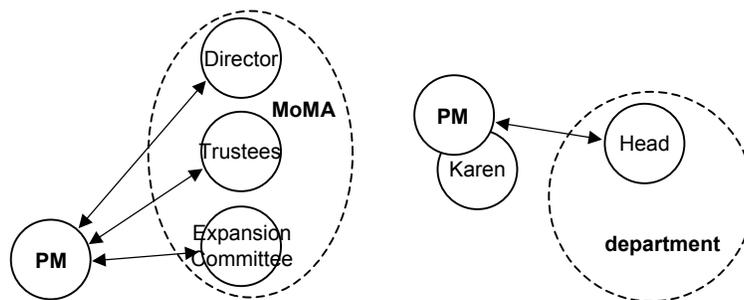


Figure 15: communication protocol within the client
 left: for issues affecting MoMA as a whole
 right: for department-related issues

Inside MoMA, the project managers filter the information to the architects. For issues affecting MoMA as a whole or the users generically, the director, Board of Trustees, or Expansion Committee can be seen as the client. For issues affecting only one group or the staff within one of

the departments, the head of that department is seen as the client. Karen Davidson works alongside the PMs to sort out the needs of each department.

Project delivery system—fast-track

According to Terence Riley, fast-tracking allowed MoMA to get in the ground quicker, although it is difficult to evaluate given the circumstances. As a result, when September 11 occurred, the project was too far advanced for any solution other than going forward. Certain items were bought at higher prices than they might have been had there been no fast-track, but others are coming in lower than expected. The only definite observation is that fast-tracking leaves the construction process vulnerable to rapidly changing events. Fast-tracking has also allowed the Museum to devise a way in which the finishing of the lower floors will precede the completion of the tower above, thus allowing for a late 2004 opening, which was PM Jean Solomon's great contribution. This has a huge benefit in terms of reestablishing the Museum's presence and revenue streams.

The risk of fast-tracking is that, under "normal" circumstances, it diminishes the role of the architect in favor of the managers. However, in light of the intense pressures and rapidly changing conditions surrounding the project since September 11, it may be a benefit in terms of the project's overall progress. For MoMA, fast-tracking is also beneficial for fund-raising. The visibility of the work early in the process helps raise additional funding for the completion, since it is not always possible to raise all funds before work begins.

Distance between the US and Japan

Distance and difference in building cultures present a learning curve for both parties in terms of communication and process. Nonetheless, any client who wishes to achieve more-than-ordinary results must accept more-than-ordinary conditions for success. Over long-term project, 12-hour flight times are a difficult challenge. New technologies, such as more sophisticated teleconferencing, and their costs must be considered part of the process. In terms of the use of technology, email is obviously indispensable, but a great deal of design exchange is done by fax, with updated computer files of the base drawings on a regular bi-weekly schedule. Email is regarded essentially as a corresponding tool rather than a design tool. KPF sends photos of models and materials and some web-site information electronically. The architects have used teleconferencing, particularly in the design development phase, when for one reason or another travel was not possible. Direct contact remains essential for the entire design process.

Asymmetry of information

According to Riley, the only solution to the asymmetry of information is a different legal association such as a joint venture. "Joint ventures, nonetheless, were considered and rejected for many reasons," he commented.

Information technology

Although the project employs several design tools, there are some shortcomings for each tool. MicroStation is inferior for data file management. Its file system does not allow specific file names. Data sharing between 3D and 2D is difficult and not practical. They have essentially two different databases. In addition, Taniguchi's design process requires physical models to confirm the design. All the spaces must be reviewed in 3D physical models that are mainly made out of foam core.

To cope with distance issues, the management team employed Citadon (Exhibit C, log-in page) as a coordination tool for the design development. The team thought that enhancing coordination would, in turn, improve design quality. However, updating and uploading the information was a burden for the design team, especially for Taniguchi's office. Compared to the US, communication cost was high and its speed was slow; DSL and broadband were not popular when they started using it. Even KPF, which plays a coordination role with the owner and local engineers and consultants, did not upload information very often. Because each participant wanted printouts to review, a huge volume of drawings was shipped out in parallel with uploading them. Increased

speed of courier poses no stress in exchanging drawings. Eventually, during the construction documents, the project team found that Citadon could not handle the huge volume of drawings and terminated its use. After that, the architects emailed documents, including sketches and certain visual files, and they regularly send CD-ROMs of the project's advancement.

Cultural differences

Cultural differences have significant impact when two architects from different contexts and countries collaborate. The different regulations and understanding about disabled people exemplify this situation. An American office like KPF is very sensitive to all of the issues involved in ADA (the Americans with Disabilities Act). Taniguchi is not sensitive to ADA compared to Americans because regulations are quite different in Japan, the way of dealing with these issues is different, and it does not happen in such a litigious circumstance. KPF has experienced lawsuits related to ADA regulations. It is said that the more prominent the building, the larger the target for lawsuits. Architects are liable and there is no legal mechanism by which the architect can transfer responsibility to the owner. Taniguchi's position is a very different one because he does not carry the same liability as KPF. Although the MoMA design team takes what they call a very radical position in the office, since KPF has experienced difficult situations, they are very sensitive to the issues of liability.

CONCLUSION

This case study focuses on three issues: the design architect and the executive architect model; the design team structure to insure Taniguchi's design quality in the US; and the possibilities of distance collaboration that information technology can devise.

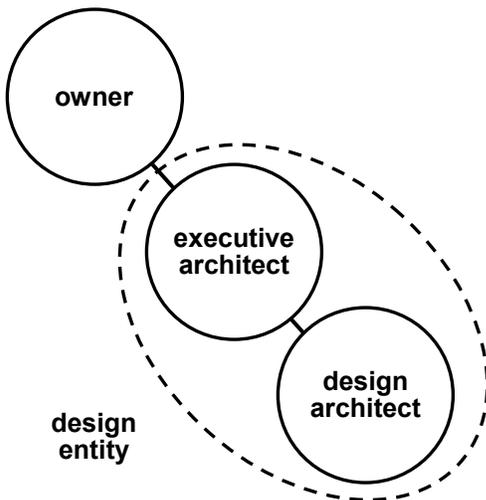


Figure 16: design delivery diagram

Executive architect

This executive architect model involved a conventional contractual relationship in which the owner took the lead. After Taniguchi was selected through a two-part selection process, he wanted to create his own office in New York so that he would be able to control the process as he had done in Japan, paralleling I. M. Pei's experience creating his own office in Paris exclusively for the Grand Louvre project. Pei's main concern was control of the documents, and he realized at some point that he could not control them if he worked remotely from New York with a local associate architect. In his case, his direct connection with President Mitterrand and the French government's search for a new model of architectural practice allowed him greater control.¹⁶ His familiarity with the American bidding system was probably advantageous. On the contrary, MoMA wanted to have a local executive architect and chose KPF. The reasons included: a traditional notion of separation of design and

production; the special conditions of New York construction processes; the preferred proximity to client and site; the different competitive bidding system in the US from that of Japan. The executive architect model was facilitated by the executive architect's proximity to the client. However, Taniguchi has had fewer opportunities to participate in the evolving situation because of this executive architect model.

¹⁶ For detail, see the case study of "The Grand Louvre."

More-than-ordinary arrangement

However, every party understood the special nature of Taniguchi's design, which would require careful coordination and the goal of the Museum to achieve more-than-ordinary results. Extraordinary arrangements were carried out. First of all, according to Taniguchi's preference for working with a designer rather than with a production office, KPF, a high-design-profile office, was assigned. In addition, the contractual arrangement enabled Taniguchi to be involved in the latter phases of the design, including checking the construction documents and shop drawings, which was not permitted during previous MoMA projects. Moreover, to ensure not only the constructability but also the design quality, KPF was involved in the project even from the schematic design phase, working very closely with Taniguchi to support his office in the challenge of their first international project and the largest institutional building they have ever built. The key to this arrangement was that the distinct roles of responsibility were set up from the outset, which created a collaborative relationship between design architect and executive architect, a different model from the conventional hierarchical model (see Exhibit E for the value-enhanced process).

distant collaboration

Although both architects affirm that direct contact has still remained essential, they used videoconferencing, particularly in the design development phase when they needed to make the design have reality, and when travel was not possible. In addition, digital data transfer has been critical to carrying out a distant collaborative project. Therefore, architects of both firms are required to have some information technology skills. At KPF, they varied a great deal, but everyone except the senior design and management people are conversant with at least MicroStation and AutoCAD in two dimensions; two or three of the staff are good at 3D applications. Senior people have varying skills and are conversant with CAD, but do not necessarily use it on a day-to-day basis. Taniguchi's office, where 2D MiniCAD skills are necessary for the design staff, had to learn MicroStation. For inter-organizational coordination, the MicroStation data (*.dgn) is translated into AutoCAD data (*.dwg), except at one engineering firm that used MicroStation (see Exhibit F for discipline map and the use of CAD systems). In terms of computer-aided manufacturing (CAM), although no special CAM is used, it is now part of the manufacturing process for many contractors, e.g. curtain wall, perforated panels, etc. An in-house designer at KPF also did virtually all of the 3D modeling and renderings in MicroStation. Whatever the system the office uses, the current architect is required to have minimum skills in 2D CAD along with generic use of word processing and email. 3D modeling and rendering skills are becoming commonplace, though not strictly required yet.



Figure 17: Construction workers install a glass panel on the Fifty-third Street façade of the new gallery building

Source: *MoMA members pocket guide*, January/February 2003

EXHIBIT A—PROJECT DELIVERY SYSTEM

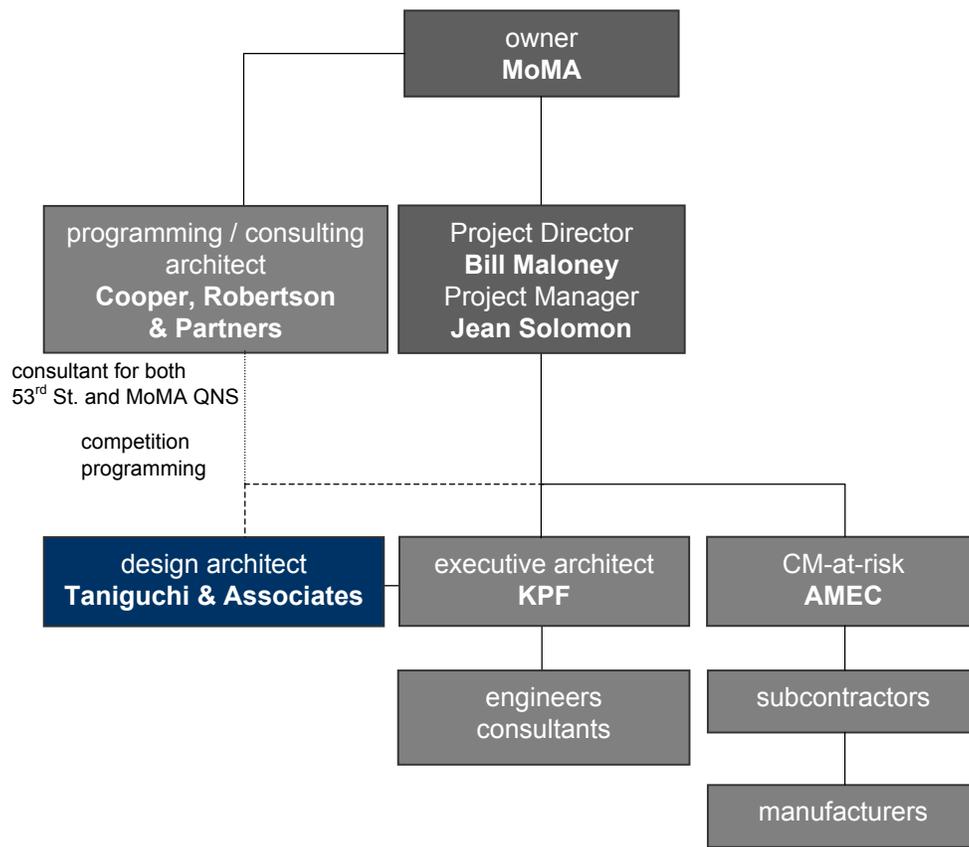


EXHIBIT B—PEOPLE AND TASKS

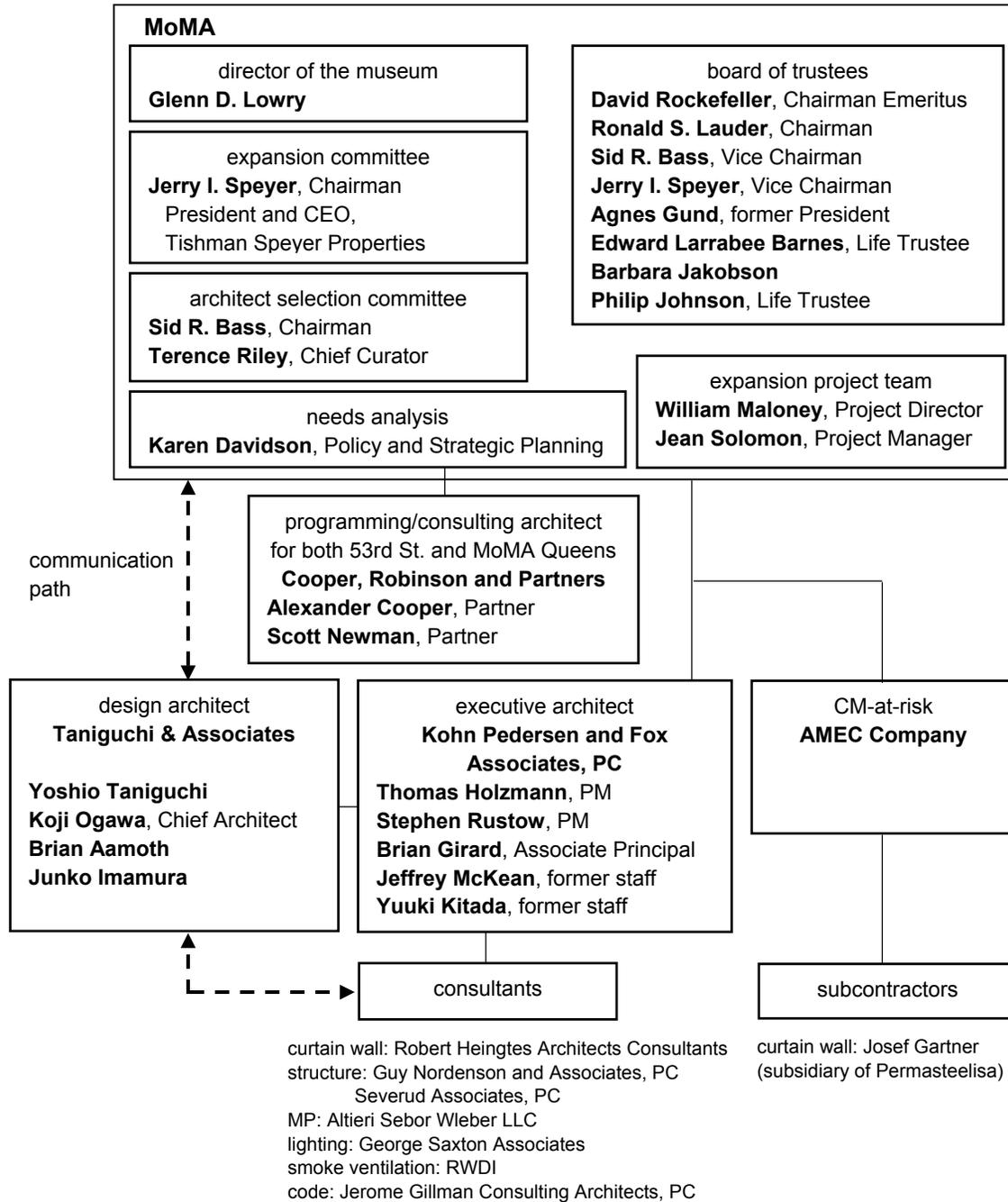
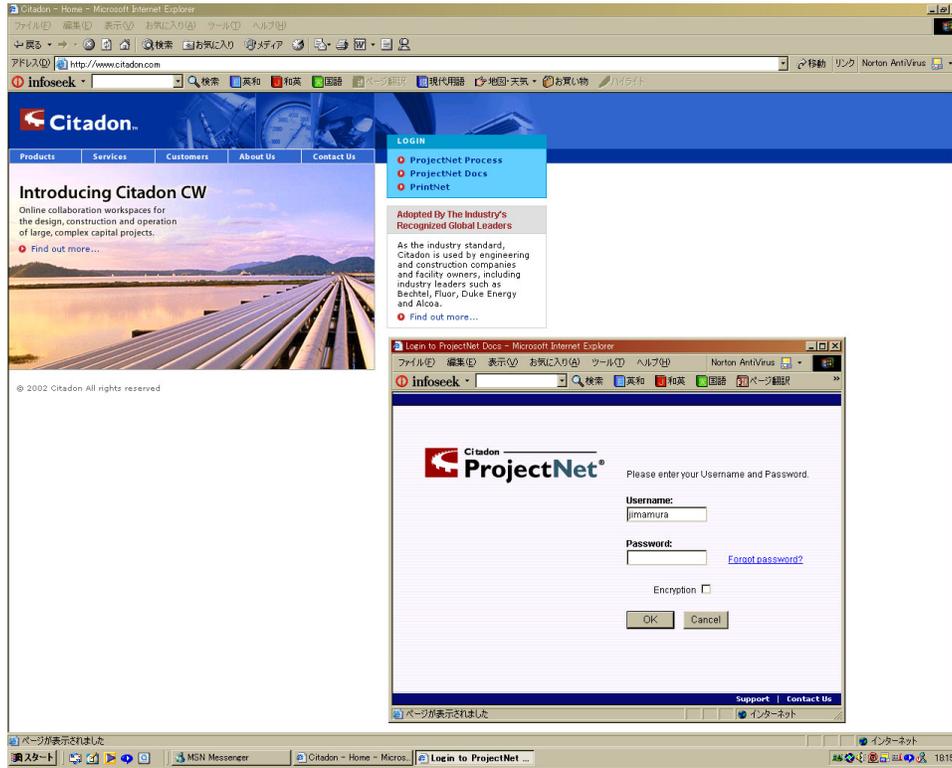
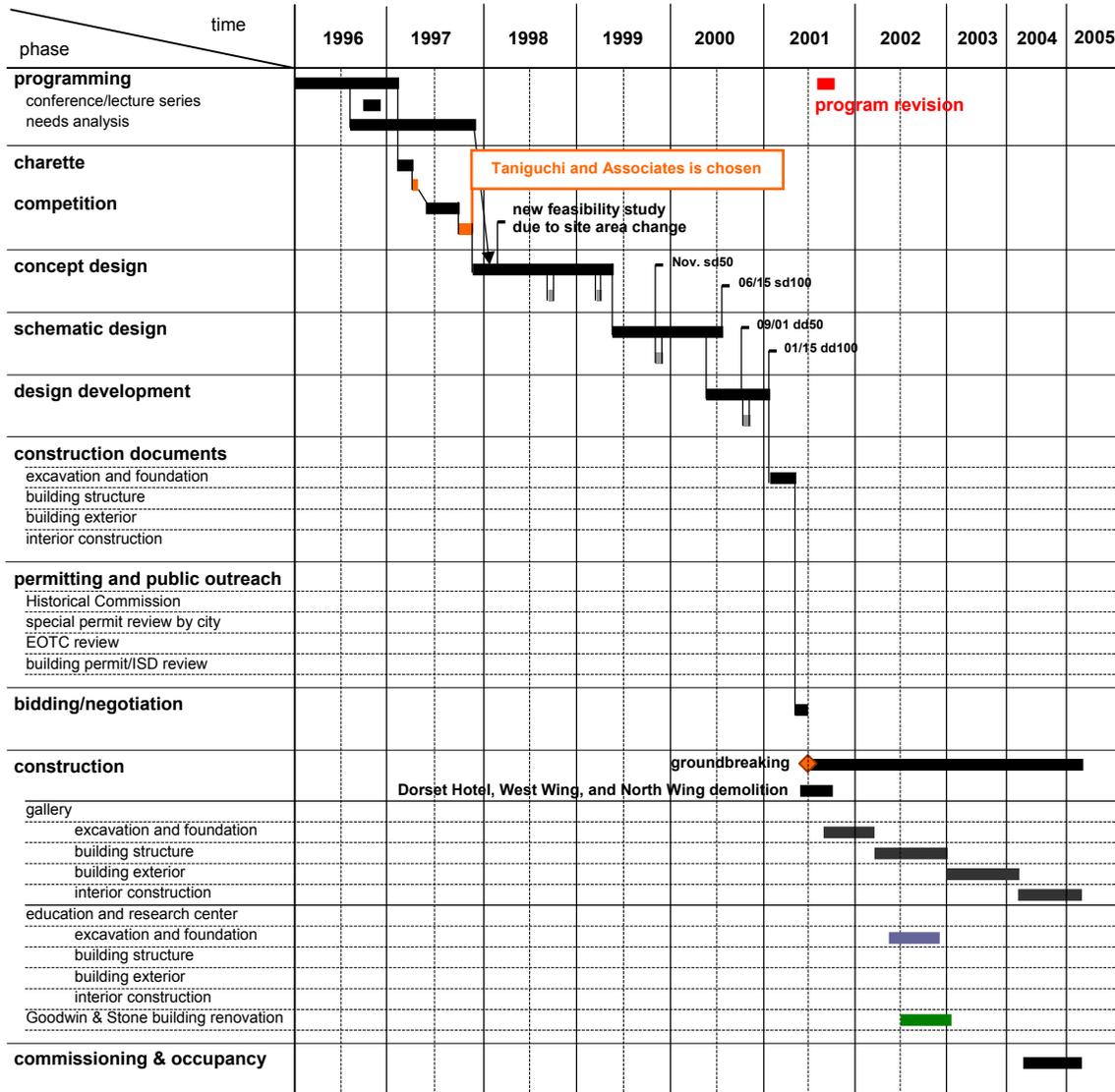


EXHIBIT C—EXTRANET



Citadon: project web site for formal communication and repository;
use of Citadon terminated during the construction documents phase due to its inability to
handle large numbers of drawings
source: Taniguchi and Associates

EXHIBIT D—MASTER SCHEDULE



█ : MoMA review and cost estimation

Source: Taniguchi and Associates and MoMA Builds web site

EXHIBIT E—VALUE-ENHANCED PROCESS

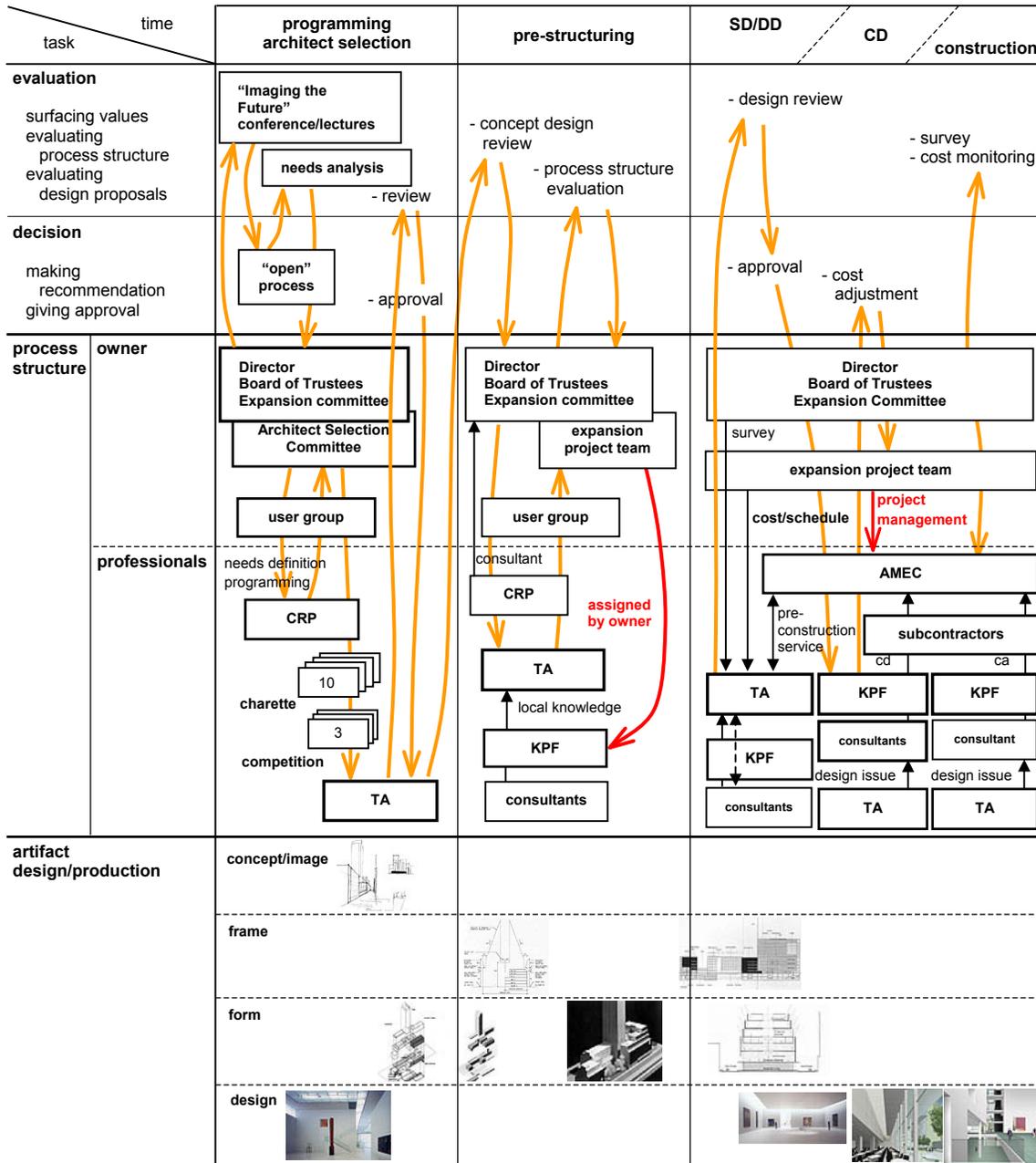
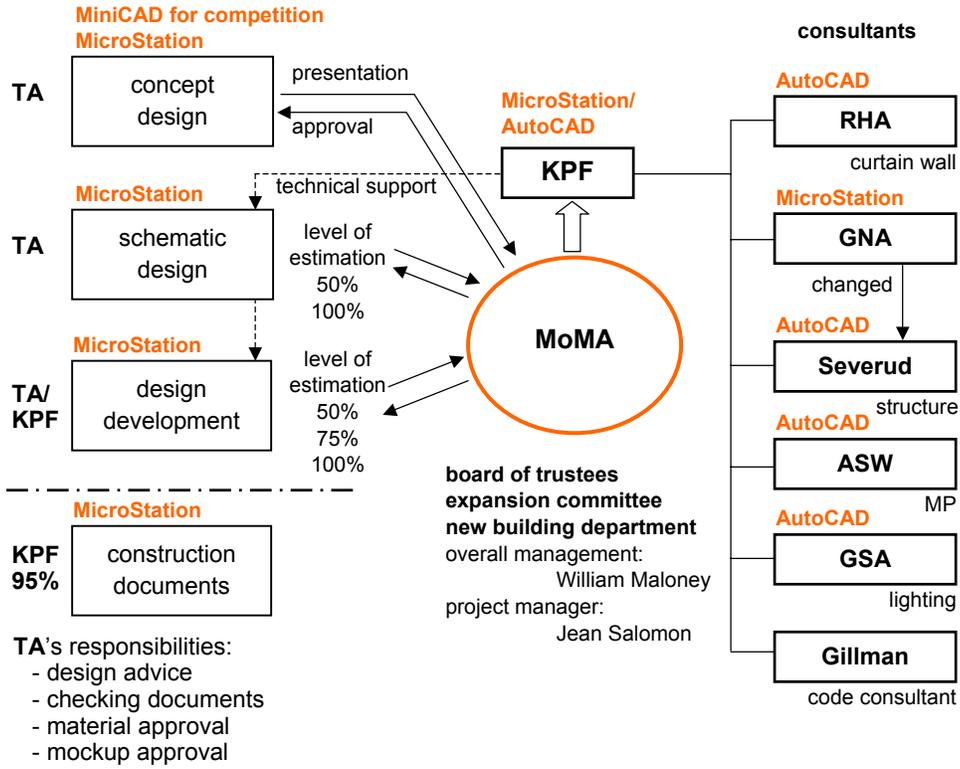


EXHIBIT F—DISCIPLINE AND CAD MAP



Source: Taniguchi and Associates and KPF

EXHIBIT G—DESIGN DELIVERY MAP

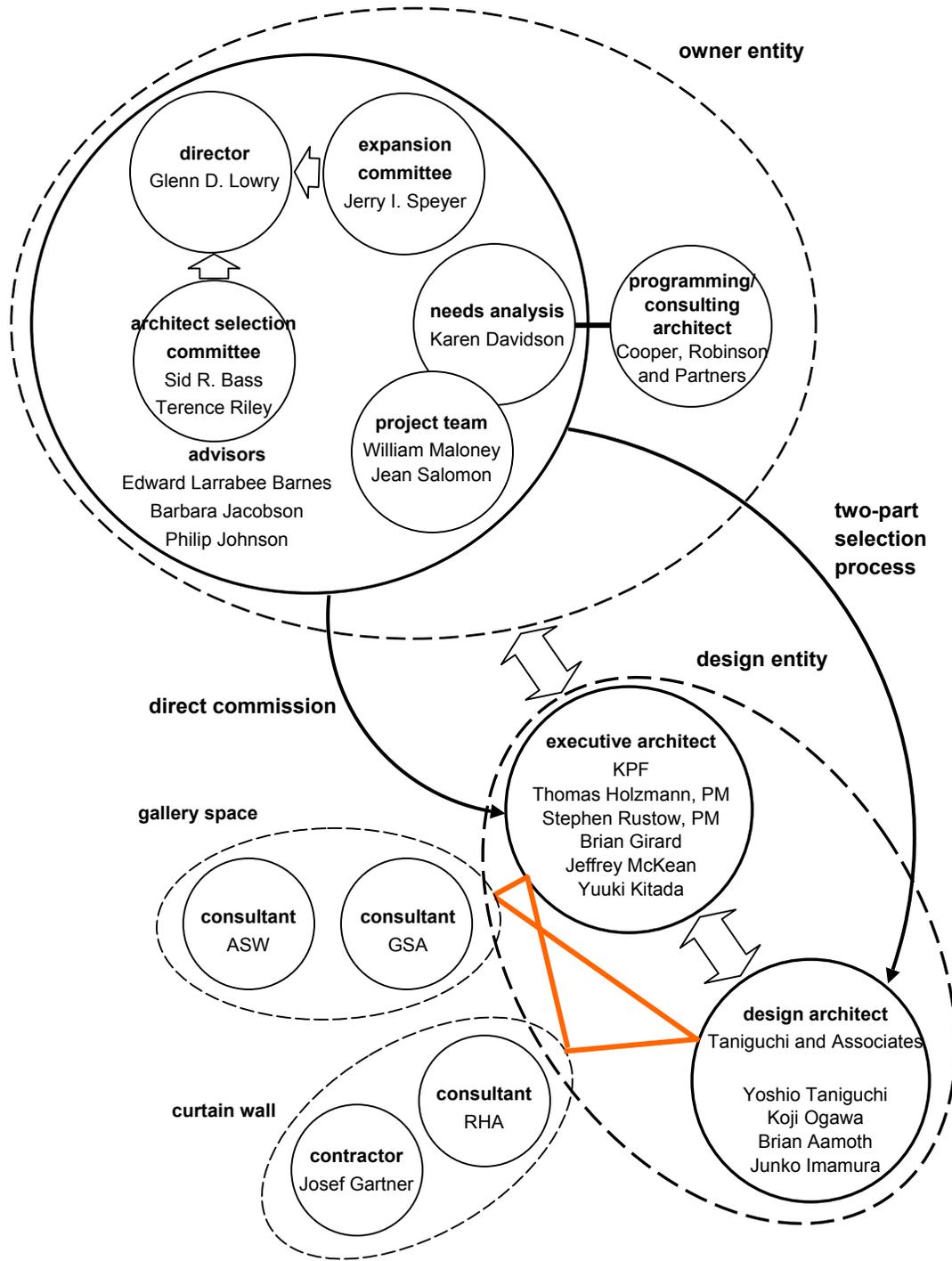


EXHIBIT H—DIFFERENT INTERESTS

activity	who	derivation of profit	preferences	sensitivity
building use	user	remuneration	better space and function	time, service, donor not construction \$
	owner	own fund donation	better facility, increase of utility, reputation	slowdown, donor bad experience, \$
needs definition and programming	expansion committee	own fund donation	better space and function innovation experiment represents MoMA	time, service, donor not construction \$
	consultant architect			
project management	PM project director, project manager	MoMA full-time employee	represents MoMA protects MoMA increment in asset value getting value according to investment	management + time owner quality, liability neighbor, \$
construction management	CM/GC	fee income or profit from efficient management of process	display of craftsmanship not "just finish and go" increase fee income ↓change ↓coordination	management + time not change order if paid
design and consulting	design architect		reputation - design	liability, slowdown bad experience, \$
	executive architect		reputation - design - sympathy for Taniguchi	slowdown, \$, quality of execution change order design community
	consultant		reputation - performance enhanced value-added	owner, architect
detailed design and production	subcontractors	profit from process	finish contracted work increase productivity but in many cases no motivation of time and \$	time, \$ no customer services
materials and components manufacture	manufacturer	development and sales of products primarily to meet end-user requirements	make as specified open new market increase market share	delivery, quality, \$, GC, architect for spec-in
				↓: less interest

EXHIBIT I—FACILITATORS AND INHIBITORS

facilitators	inhibitors
<p>common</p> <ul style="list-style-type: none"> - electronic data transfer - IT for coordination; e.g. videoconferencing <p>owner</p> <ul style="list-style-type: none"> - commitment to the process of conceptualization of the new museum: <ul style="list-style-type: none"> • Imaging the Future Committee • Pocantico conference • “Building the Future” lecture series • survey of the museums • selection of an architect - leadership - personal commitment - needs analysis - having in-house PM - CM - local executive architect with high design profile - fast-track for schedule/fund raising <p>project manager</p> <ul style="list-style-type: none"> - leadership for more-than-ordinary project <p>design architect</p> <ul style="list-style-type: none"> - understanding the institution - interesting owner - culture sharing (US degree) - local partner - use technology of manufacturer up front <p>executive architect</p> <ul style="list-style-type: none"> - sympathy for architectural style and goals of Taniguchi - museum experience - exposure to important client - functioning as contact point 	<p>common</p> <ul style="list-style-type: none"> - distance - translation between people: asymmetry of information - liability - cultural difference; e.g. ADA - decision-making structure: less clear - working in New York <p>owner</p> <ul style="list-style-type: none"> - construction experience <p>design architect</p> <ul style="list-style-type: none"> - different process: separation between design and production - less opportunity for participation in evolving conditions - fast-track <p>executive architect</p> <ul style="list-style-type: none"> - increased coordination of tasks - distance is not an inhibitor <p>general</p> <ul style="list-style-type: none"> - site conditions: Manhattan Midtown block zoning code

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KPF	http://www.kpf.com/
MicroStation	http://www.bentley.com/
NULUX	http://www.nulux.com/
Permasteelisa	http://www.permasteelisa.com/
RHA	http://www.eharch.com/
Severud Associates	http://www.severud.com/
Tishman Speyer	http://www.tishmanspeyer.com/
Gartner	http://www.josef-gartner.de/

