Temporary assignments and a permanent home:
A case study in the transition to project-based organizational practices

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December 2002

The tasks large corporations must master to achieve competitive advantage today—developing new products on accelerated schedules (Stalk 1988), providing tailored solutions to customers (Hax and Wilde 1999, Galbraith 2000, Foote et al. 2001), implementing next-generation information technologies (Clark et al. 1997)—require deploying groups of workers with a broad range of skills for short periods of time. This can be difficult for large firms whose people are slotted into fixed positions inside hierarchical units.

Some industries have long experience with rapid, short-term deployment of talent. In professional services organizations—investment banking, law, accounting and management consulting firms, for example—work gets done primary by temporary internal project teams (Eccles and Crane 1987; Maister 1993). And the film production (Storper and Christopherson 1987) and construction industries (Eccles 1981) rely on temporary teams comprised of free-lancers and subcontractors. The new venture sector also operates in this way, when an entrepreneur collects a management team while forming a startup. The hope is that the new firm will prove to be more than a temporary entity by growing into long-lived firm. But venture capitalists recognize the temporary character of most startups—valuations and anticipated returns on investment are based on the assumption that most new ventures will fail (Clayton et al. 1999).

In a prior article, we speculated about a future economy characterized by e-lancing—electronically connected free-lancing (Malone and Laubacher 1998). In that piece, we reflected on the institutional infrastructure that would need to be in place for e-lancing to become prevalent. In recent years, Web-based talent brokers, such as guru.com and elance.com, have built successful electronic marketplaces where solo contractors and small firms link up with customers who need their services on a project basis. These Web-based talent markets operate effectively across traditional organizational and geographic boundaries (Snir and Hitt 2000).

Practices from other industries that rely on temporary teams, our reflections on the prospects for e-lancing and lessons gleaned from the first generation of e-talent markets can provide models for large corporations hoping to make greater use temporary internal teams. This article is a case study of Infrastructure Strategic Engineering (ISE), a research and development unit within Hewlett Packard's Information Technology (IT) group, as it made the transition from a functional organization to one based on temporary project teams. ISE's organizational goals were ambitious, influenced by the practices of the Silicon Valley new venture sector, the film industry and our speculations about e-lancing. Several features of ISE's approach were notable: grass-roots generation of ideas for new projects, a concept borrowed from the new venture sector;

and extensive two-way communication between project leaders seeking talent to staff their teams and researchers seeking to get assigned to projects, a central concept behind e-lancing.

The case shows the complex challenges associated with this change. ISE implemented new processes and Web-based tools to generate cross-disciplinary social capital and, where needed, reinvigorate existing networks that had grown stale. But making the transition to project-based organizational practices required more than just new processes and tools. To make this shift, firms must also redefine managerial roles and reshape the mission of legacy organizational groupings. For the transition to be effective, an organization's former units have to be transformed from places where work gets done into looser entities that provide career support and a sense of community—what we call internal guilds. These internal guilds can give workers who rotate through a series of temporary project assignments a place within the firm that is like an ongoing home, to mitigate the uncertainty associated with the move to temporary project teams.

HP's Infrastructure Strategic Engineering (ISE)

Infrastructure Strategic Engineering (ISE) was an organization of approximately 100 highly skilled experts who played a research and development role within Hewlett Packard's IT group. ISE's charter referred to ISE as "HP Labs for HP IT." ISE's mission was to identify and assess emerging information technologies that would allow HP's people to work together more effectively in the future. ISE was created in the spring of 2000 as part of a major reorganization of HP's IT group. In the spring of 2002, with the closing of the HP-Compaq merger, ISE was folded into the reorganized IT group at what came to be called the "new HP."

Formation of ISE, Spring 2000

In spring 2000, HP moved responsibility for operation of its corporate infrastructure from its internal IT organization to its IT services unit, which also served external customers. This group was renamed Hewlett-Packard Operations (HPO); it included more than half of the 8,000 employees who were previously part of the internal IT organization. Most of the IT organization's remaining employees stayed in that group to develop enterprise software applications for HP businesses. But 150 people from central IT were assigned to two new IT research and development organizations—100 to ISE, which looked at next generation technologies that could be applicable across the entire corporate infrastructure, and 50 to a unit that undertook similar work on business-specific applications. In addition, a new group, Enterprise Services (ES), was formed to represent HP as customer in the relationship with HPO.

Prior to the reorganization, HP's IT group been a functional organization, with internal units based on technical discipline. For example, some people were responsible for network security, others for PC operating systems. The unit in charge of a particular area oversaw activities across the entire technology life cycle: from day-to-day operations and maintenance; to implementation of upgrades; to scanning for, selection of and migration to new technologies. There was also a geographic dimension to the functional organization. For example, there were

central personnel who had global responsibility for security, as well as local personnel who had responsibility at a particular HP facility.

Four senior managers comprised the ISE leadership team, and they selected the people who became part of the new organization. They chose from all disciplines, favoring those who had shown a knack for technology strategy and for finding and installing new technologies. People with such traits were typically among the most talented members of the IT group.

The resulting organization turned out to be quite dispersed geographically, with a large percentage of people working from home offices for at least part of the week. ISE supported over 70 worksites, in an organization of approximately 100 people. As a counter to this dispersion, the senior team tried to ensure that clusters of ISE people were located near hubs where HP had large facilities. Over thirty ISE employees were thus sited around the largest hub and another thirty-plus combined were close to five large HP sites in other parts of the U.S. Locating workers near a hub made it theoretically possible for people to congregate face-to-face, but such meetings in fact occurred infrequently. For example, nine ISE employees were based out of the third largest hub, but all of them worked from their homes most of the time and visited the HP facility in their city only very occasionally. Similarly, a significant proportion of ISE people at the largest hub worked from home either full time or for a portion of the week. The experience of many ISE employees located near the hubs was thus much like that of the thirty or so who worked by themselves or with a few ISE colleagues in the other locations spread out among five foreign countries and eight non-hub sites in the U.S.

At the time of ISE's launch, its four senior managers were still finalizing plans about how the new organization would operate. People were thus initially assigned to short-term research projects, most of them on topics related to their area of prior technical expertise. Project teams were formed in an ad hoc way, with people grouped together largely based on prior expertise.

Developing a vision, Summer 2000

Because they were leading a new organization inside HP, the ISE senior team focused initially on developing a new charter, structure and core processes. ISE's initial mission was to undertake research on technologies that could have impact on HP's IT operations within three to five years, with an emphasis on potentially disruptive technologies. The primary sponsor of ISE's work was the senior leadership of HP's IT group; in addition, its research was seen as potentially valuable for managers at HP product and service units that served external customers.

The focus was on disruptive innovation because the former functional organization, while good at incremental upgrades, had been less successful at identifying and implementing technologies that represented a break with the past. A widely-accepted explanation for this inside ISE was that the old IT organization, tightly embedded at HP sites, and driven by short-term demands, had listened closely to internal customers and delivered the requested enhancements to existing systems. This worked well for established technologies, but not so well with emerging

new technologies that lay outside the comfort zone of internal customers—like the Internet and World Wide Web.

In building their organization, the ISE senior team emphasized culture and values over organizational structure. As one member of the team put it, "We were trying to enable innovation, flexibility, creativity. Our idea was that people would have a chance to get deeply into their technical domains, while at the same time, we could build teams on the fly." The senior leaders developed what they called the "Picasso model" organization chart, consisting of three "blobs," which represented major technical areas and which were called "competencies"—Infrastructure, e-Services/Collaboration and Technology (the latter area included operating systems, mobility and architecture). The Infrastructure competency had approximately 45 people, the other two approximately 25. The idea was that people could be drawn from the competencies to form temporary teams on an as-needed basis. The competencies were not envisioned as fixed organizational entities, but rather, were to be shaped by the changing demand for expertise that would emerge as technology priorities evolved. As ISE's charter put it, "The competencies will be fluid and flexible; they will grow, shrink, emerge, disappear, or merge as we follow the natural path of our scanning research, prototyping, and design of IT infrastructure strategies and architecture."

The primary rationale for this organizational approach was that it would encourage cross-disciplinary work. The old functional IT organization had led people to think about the future primarily within the context of their narrow specialties. But there was widespread agreement among ISE's senior team that identifying next-generation breakthroughs would require thinking that spanned disciplines. The leaders' assumption was that to spur this kind of thinking, teams needed to include a broad range of expertise.

An organization based on technical competencies and temporary project teams was seen as having other advantages as well. It differentiated ISE from other parts of HP's IT organization, which continued to be organized as functional hierarchies. Its novel organizing principles gave ISE a cachet, as one person put it, a "mystique." The senior leaders also felt ISE's free-form organization would help to attract top talent, both from inside HP and from other firms. An addition perceived plus was that the new organization showed ISE to be aligned with several initiatives launched by the new CEO, Carly Fiorina, soon after her arrival at HP. At the time of ISE's formation, Fiorina was working to move HP from its prior focus on stand-alone products toward an emphasis on providing customer solutions. The ISE charter quoted Fiorini's vision of HP "as a company that not only provides an 'always-on' infrastructure, useful e-services [and] information applications, but…[a] company….[that] can *occupy the intersection* of all three components as well." The three areas highlighted by Fiorina roughly corresponded with the three competencies that served as the basis for ISE's organization. ISE's organizational approach also fit well with Fiorina's effort to build HP's services arm. As one of the senior leaders at ISE put it, the new organization "models us after a consulting firm, a direction we need to go in the future."

There were four major roles within ISE. The senior team, known as the ISE Staff, included the general manager and managers of the three competencies. This leadership team was typically spoken of as "ISE Staff" or "Staff." They set overall direction; served as liaison to leaders of IT group and HP business units, as well as HPO and ES; selected projects to be undertaken and set their budgets; and oversaw the three competencies.

First line managers were heads of technical sub-areas within the competencies; for example, within the Infrastructure competency, there were groups responsible for Authentication and Directories; Intrusion Detection, Networks and Middleware; and Connectivity. These sub-units within the competencies were typically referred to by their names—for example, "our team has one engineer from Networks"—or spoken of as "groups"—for example, "two other people from my group." There were 12 managers of these groups, each with between 4 and 11 direct reports. First line managers were responsible for approving project assignments for their direct reports; undertaking performance reviews and providing coaching and career advice; and in some cases, providing thought leadership in their subject domains.

Individual contributors primarily served as members of project teams, with some assuming a leadership role on projects. Project managers were responsible for heading teams. While a few people at ISE specialized in this role, for the most part, project managers were drawn from the ranks of individual contributors.

VC Cafe, Fall-Winter 2000-2001

To encourage cross-disciplinary work and creative thinking as it launched its first formal slate of research projects, the ISE staff developed an idea borrowed from the new venture sector of Silicon Valley, what they termed the "VC Cafe." This was a virtual meeting held every three or four months, where the Staff served as venture capitalists—the VCs—and anyone in the organization could present ideas for new projects and seek to get them funded. The ideas were rated on three dimensions—whether they were interesting, disruptive and important. ISE's people generated more projects ideas than could be presented in time allotted for the VC Cafe, so in a preliminary stage of the process, ideas were presented informally to the managers of the competencies, who chose a subset to forward to the VC Cafe. Typically, there were 20 to 25 ideas at the start of the process; 10 to 15 would be presented at the VC Cafe; and 5 or so would get funded. Other mechanisms were also put into place to encourage the surfacing and refining project ideas, including an on-line idea forum and peer review process.

Several VC Cafes were held in late 2000 and early 2001. The projects chosen at them accounted for approximately half the work going on in ISE during the first half of 2001. Among the projects that emerged from the VC Cafes were one to examine peer-to-peer computing in enterprise settings and another to determine the feasibility of a corporate "outrastructure," where connectivity and applications were provided solely via the publicly accessible Web. Other ISE projects developed out of ideas generated inside the competencies and brought forward to the

Staff by first line managers—these were known as "angel-funded" efforts. Other projects arose out of research requests sent to ISE from senior leaders in HP's IT group.

With the VC Cafe, the ISE staff introduced a marketplace of ideas to help select the projects they would fund; in determining who would be assigned to which projects, they similarly put into place a kind of marketplace for talent. Their vision was that people in ISE would be able to express preferences for which projects they wanted to work on; then, based on a combined consideration of those preferences and project needs, staffing decisions would be made. This vision was put into operation through a system by which ISE employees were able to "bid" to indicate their interest in being assigned to a project.

When an idea was approved at the VC Cafe, the leader of the new project sent a notice to everyone in ISE describing the effort and the kind of expertise that was required. Recipients of the message then had an opportunity to "bid" by sending an email response expressing interest. Individuals could also call the project leader to learn more about the project. Once this round of emails and conversations took place, project leaders negotiated with first-level managers to get people formally assigned to their projects. Individual contributors were told to check with their managers before expressing such interest, and in some cases this did not happen, which led to some misunderstandings and friction. Assignments on non-VC Cafe projects were handled more traditionally, with a project leader contacting first line managers to request resources and those two parties negotiating until a satisfactory solution was reached.

By early 2001, the VC Cafe process was well in place and ISE was running a full slate of projects. The typical team had 2-4 members, each working part-time; most people juggled several projects. Most teams included people from other parts of HP—often HP Labs, but also frequently from groups that would implement future technology upgrades, such as ES, HPO and HP business units. Project duration ranged between one and six months. Periodic review meetings, which anyone in ISE could attend, were used to track project progress. At competency reviews, a subset of the teams working on projects initiated by a particular competency would present their work to the competency manager. Peer reviews were more technically oriented, targeted at experts interested in the technical issues being addressed by the project.

Assessing and enhancing, Spring-Summer 2001

In the spring of 2001, the ISE Staff undertook an assessment of the workings of the VC Cafe. It identified a series of concerns that had arisen. Some had to do with the public nature of the VC Cafe process. Some people felt the process favored those who had good presentation skills; others felt that it gave too much prominence to VC Cafe ideas and not enough to efforts generated within the competencies or via requests from senior IT leaders. The periodic nature of the VC cafes also led some to fear that people were hoarding ideas until it was time to unveil them in the next high-profile forum. The bottoms-up nature of idea generation led some to fear that the portfolio of projects generated by the VC Cafe might not align with the evolving list of priorities articulated by senior IT unit leadership and by ISE Staff. And some first-line managers

felt that the bidding process had undermined their authority, since it allowed individual contributors to contact project leaders directly to express interest in a project and did not require them to confer with their managers first.

The ISE Staff had also observed variations in the kinds of contributions that managers valued in directing their group's efforts and evaluating their direct reports. For example, some emphasized building prototypes, others focused on publishing white papers, and still other focused on creating ties with projects that were tied to emerging IT needs inside HP operating units. In response, the Staff prepared a document entitled "What's important," which outlined what the staff valued and what managers were expected to recognize in performance evaluations.

During this time, ISE was recruiting recent college graduates to join the organization. The opportunity to do research at an established firm proved an attractive option for many candidates, and seven were hired and scheduled to start work in the fall, a sizeable incoming group in an organization that at that time number approximately one hundred.

Around the same time, a member of ISE Staff contacted us to discuss our prior research on elancing and guilds (Laubacher and Malone 1997; Laubacher and Malone 2000) and to explore ways this work might inform the future evolution of ISE's efforts. We held conversations to explore areas of mutual interest, and out of them an idea for a joint project emerged. The focus of the project would be to introduce next generation enhancements to ISE's project staffing process, influenced by thinking from our past work and a more recent project examining "e-lancing and the enterprise" (Laubacher and Malone 2003).

Tech slowdown and merger plans, Fall-Winter 2001-2002

In the summer of 2001, the industry-wide slowdown in the technology industry began to have a major impact at HP. The company announced its first layoffs since the 1940s, cutting 4 percent of its workforce in mid-2001 (Deogun et al. 2001). Then in September, HP announced plans to merge with Compaq. The industry slowdown and impending merger with Compaq led ISE Staff to reorient their organization in response.

ISE had to let a small number of people go as part of the layoff. Salary increases were deferred and travel budgets cut throughout HP. One result was the cancellation of many planned face-to-face meetings of ISE's virtual project teams and geographically-dispersed technical groups. Emphasis shifted away from the bottoms-up, self-initiated efforts characteristic of VC Café, toward more explicit alignment of projects with the priorities of senior IT leaders and of ES and HPO, while also still attending to the VC Cafe criteria of "interesting, disruptive, important." ISE Staff worked with IT leaders and other constituencies to develop five overarching research themes for ISE and worked to ensure that ISE's portfolio of projects fit within that framework. ISE's time horizon moved in as well, from a focus on disruptive technology that would have an impact in three to five years, to more incremental developments that would have an impact in twelve to eighteen months. There was also a conscious effort to undertake fewer, larger projects that could have greater influence inside HP. These changes were exemplified by the renaming of

the VC Cafe—in early autumn 2001 it was renamed the Theme Cafe. Over time, the ISE Staff stopped holding separate meetings focused on project funding; instead, funding decisions became part of the agenda at regular meetings of the Staff. Driven by these changes, in late 2001, several large projects were launched based on the themes, some with ten or more team members, often including significant numbers of people from HP Labs and other HP units. As a result, by early 2002, large projects staffed with the equivalent of 3 to 4 full-time ISE people—which usually meant 6 to 8 actual ISE team members, since most people worked on projects less than full-time—accounted for 30 percent of ISE's available time. And 3 mega-projects with 4 to 8 full-time equivalents, accounted for another quarter of ISE's talent.

During this time, the joint MIT-ISE project was also launched. Its objective was to expand on the sell side bidding process instituted in the VC Cafe, in which individual contributors could express preferences for which projects they would work on, by adding a buy side, so that project managers could seek out talent they wanted to attract to their teams.

A "New HP," Spring 2002

After the merger closed in June 2002, some resources from ISE were reassigned to operational duties to address the short-term challenges of integrating the IT infrastructure of HP and Compaq. Corporate and IT leadership decided that entire IT organization would be transitioned over time to become part of the IT services unit of the combined companies. A newly-constituted IT research group would continue the kind of work that ISE had undertaken, with a somewhat shorter-term focus and with the additional charter of exploring technologies that might also be of interest to external customers of the IT services unit.

The leadership of the new IT research group included two former members of the ISE Staff. Both looked forward to finding ways to incorporate organizational practices tried out at ISE in the new setting. To mark the transition to the "New HP" and to commemorate what they had accomplished, everyone in ISE attended a virtual "moving on" celebration, which involved seventy people at six major sites, plus an additional twenty who were remote individual participants.

The study

The researchers played two roles over the course of the study. We observed ISE's efforts to put into place new organizational practices by conducting interviews, attending meetings and collecting documents over the course of more than a year. In the middle of that period, we assisted with the design of an enhanced staffing process.

Initial conversations

In May 2001, we held three informal one-to-two hour teleconferences with a member of the ISE Staff and several ISE researchers who had been working on the concept of "skills

bazaars," an idea related to our work on e-lancing. To illustrate points raised in the conversations, the ISE participants forwarded the ISE charter and several white papers and presentations to us.

After identifying areas of common interest in those initial conversations, we held five additional meetings in June and July to develop ideas for a collaborative research project. ISE Staff and HP's IT leaders approved the proposed project in August.

Design of enhanced staffing process

As part of the collaborative project, the MIT researchers participated in a joint MIT-ISE team that designed and observed the implementation of an enhanced project staffing process. The core design team was comprised of one MIT researcher, a member of the ISE Staff and two ISE researchers. In addition, the other MIT researcher and the ISE Staff member who served as internal project sponsor attended several design review meetings.

The design team's charter was to develop next generation enhancements to the ISE project staffing process, informed by the MIT researcher's prior work on e-lancing and guilds and other relevant practice and research. The design developed during October and November 2001 and reviewed by ISE Staff in November and by ISE's first-line managers in December. Three design issues emerged as central: who would have authority to make staffing assignments; what mechanisms would be used for expression of preferences; and what features would be included in the individual skills profiles posted on ISE's Web site.

A member of the ISE Staff early on recognized the importance of the decision rights issue by asking a question about the three primary participants in the staffing process—project manager, individual contributor and first-line manager—"Who is king?" In developing the design, the team considered a wide range of options. In some, one of the three parties was dominant, others incorporated mechanisms to balance power. The eventual design involved project managers being able to express interest in having particular individuals work on their projects, and in turn, individuals being able to express their wish to work on particular projects. First-line managers had to approve any actual assignments. Disputes could be elevated to a member of ISE Staff for resolution.

The design team also considered various mechanisms for allowing parties to express their preferences. At one extreme was informal, tacit expression of preference, through exchange of emails and one-to-one conversations; at the other extreme was formal expression, via rank-ordering, numerical ranking or market-like bidding using chits or real budgets. The eventual design incorporated informal mechanisms, primarily the exchange of email and voice messages.

Early on, the team chose a design that incorporated a skills database, a Web based repository with individual profiles of everyone in ISE, so that project leaders could have visibility into the organization's talent pool when they were staffing new projects. A number of issues arose over over the characteristics of the profiles. Some focused on the type of data to be included. There was agreement that technical skills and past experience should be included, but differences arose over such issues as whether and how to incorporate items like project

experience in ISE; availability; performance on ISE projects; and information on interpersonal skills and work style. Another issue was the structure of the profiles, with free-text entry at one extreme and a structured, pick-list format at the other. Finally, there was discussion over whether the skills database could be extended to other units in HP with which ISE frequently collaborated. The eventual design used Connex, a skills profiling tool developed by HP Labs, which included a mix of structured and unstructured data. Selective information about performance on ISE projects was also to be included in individuals' Connex profiles. During implementation of the design, the team explored extending the skills database to other HP units; while other units expressed interest, the demands of merger planning prevented these efforts from going forward.

The enhanced process was intended to be an incremental change. One member of the team called it an "extension" of practices launched in the VC Cafe; another team member spoke of it as "an evolution, not a revolution." The primary change was the addition of a buy side, so that project managers could have visibility into the talent pool through the skills database and could seek out people who might be a good fit on their teams. This buy side activity augmented the sell side process, by which individuals could express their interest in being assigned to a new project, that had already been introduced during the VC Cafe. In addition to creating the skills database, the enhanced staffing process also involved development of a database which listed all active projects, so anyone in ISE could obtain information about new and existing projects. The database was built by adding features to existing Project Data Sheets and by ensuring that all the project profiles were accessible via one area on the ISE intranet. The design team also explicitly articulated the staffing process and key roles, plus related performance evaluation and planning activities, which had not been previously codified. For a detailed description of the enhanced staffing process, see Appendix A.

Participation in meetings of the design team also provided us with opportunities to make additional observations about ISE's practices and to collect emails, memos and presentations. We attended 17 team meetings during the design phase and 3 review meetings—one each with the project sponsor, ISE Staff and ISE's first-line managers.

The enhanced processes were launched ISE-wide in January 2002. The design team continued to meet for the next four months to monitor the rollout, providing opportunities for us to make additional observations. We attended 9 meetings of the design team during the implementation phase, and 3 review meetings—two with the project sponsor and one with ISE Staff and ISE's first-line managers.

Formal interviews and survey

From February to May 2002, we conducted 3 interviews each with a group of 10 volunteers from ISE. The 10 volunteers were roughly representative of ISE as a whole along most important dimensions. There was an approximately representative spread across geography (4 at the largest hub, 5 at other locations in the U.S., 1 in Europe) and competency (4 e-Services and Collaboration, 4 Technology, 3 Infrastructure). In addition, 9 of the 12 technology sub-areas

that resided within the competencies were included. The sample was not entirely representative along two dimensions. Approximately half the interview subjects worked a significant amount of time at home (ranging from full-time telecommuting to at least 2 days per week), while the other half worked primarily at an HP facility, a distribution which slightly under-represented telecommuters. Roughly equal numbers of first-line managers, project managers and individual contributors were interviewed, a distribution which over-represented first-line managers.

The interviews were open-ended and conversational. Each ranged from one to three hours in duration. Detailed notes were taken during all the interviews, and most were audio-taped. We asked about employees' prior experience at HP and ISE; their perceptions of major ISE milestones such as the VC Cafe; their opinions about the effectiveness of project staffing practices within ISE and the anticipated impact of the proposed enhancements; and the nature of interactions between ISE and other parts of HP and other firms in the high tech industry. In addition, topics not initially identified by the MIT researchers as priorities, but raised by the ISE people in the course of the conversations, were also explored. In the course of the interviews, ISE people forwarded email, presentations and spreadsheets related to issues being discussed.

The ISE design team also administered a Web-based survey asking questions about the effectiveness of existing staffing practices from the perspective of first-line managers, project managers and individual contributors. This voluntary survey achieved over a 50 percent response rate (55 respondents from approximately 100 ISE employees).

Analysis

Several times over course of interviews, we reviewed our notes and wrote up summaries of findings to date. These findings were discussed with various constituencies within ISE, including the project sponsor, the staffing process design team and in subsequent conversations with interview subjects. After all the interviews were completed, we reviewed and coded our notes and all documents received from ISE to identify themes that emerged consistently in the course of interviews, design team meetings and our initial conversations. Those themes served as the basis for the findings reported below.

Study findings

ISE's shift to project-based organizational practices was a complex story that unfolded in several chapters. ISE's experience showed some of the tensions triggered in the course of this move and the range of issues that must be managed in making the transition.

A new kind of work

Moving from the operational positions in the IT group to an organization dedicated to project-based research was challenging for many at ISE. It meant that people's work became more abstract and less rooted in the everyday running of HP. The change required individuals to reconceive their roles and rethink the nature of their contributions. A particular source of

difficulty was shifting from work that had short term, tangible results to undertaking research intended to have an impact over a long period of time and whose actual influence could not be known with certainty. Discomfort people felt over this shift took several forms. Some commented on the different character of ISE's outputs, comparing the "slideware" the new research group often produced with the operating prototypes that were typically built in the old functional organization. Others commented on the less bounded character of the questions ISE addressed; one project manager contrasted the "open form" problems teams at ISE faced with the "closed form" issues dealt with in the functional IT units. People also made frequent comparisons between HP Labs and ISE, sometimes wondering whether ISE's personnel, who originally came from the IT group, were "real" researchers, as compared to the personnel at HP Labs, who were professionally trained scientists. Even people with deep and wide experience in the HP's IT group found this transition to be difficult; as one twenty-year veteran put it:

> When I took this role on, I didn't understand the specifics. It's taken me a while to evolve into it, to a point where I thought I was contributing….Where we all struggled was jumping to solutions too quickly. In the old world we would have said, let's just buy this or that, put something together and test it. In the ISE world we need to decide on…how we see migrating from the present state, then what's it possible to do to support the future world.

Another difficulty was a new reality that even good research work at ISE could result in seeming failure. ISE Staff recognized that not every project undertaken would lead to a new technology being adopted at HP; one member of the Staff estimated that at most 2-3 projects out of 10 could be expected to succeed in this way. But when teams confronted dead ends, they were reluctant to acknowledge the fact, wanting to have something to show for their efforts. Rather than reporting that a technology unpromising and that the project should be shut down, they worked hard to present lessons learned and suggested next steps instead.

Importance of informal networks

In the face of this transition to a new kind of work inside a more fluid organization, people in ISE initially relied heavily on personal connections, people they had worked with in the prior roles in HP. These informal networks in some cases mapped closely with the small groups dedicated to a particular technical realm inside ISE's competencies. In a number of instances, people who had worked together within a functional area within the old IT organization joined ISE together, with reporting relationships sometimes even carrying over.

Other networks were based on geography, comprised of people who were working together at the same HP site. And some informal links extended across functions and geographies, in instances where people had worked together in an HP location or as part of the same technical discipline in the past, but where one or more of them had subsequently been transferred to another site or function. These connections extended outside of ISE, as well, into other units of HP and into other firms in the high tech industry. One first-level manager described the range of connections he could access:

> The network of technical talent is 25 or 30 years old. When HP went away from site autonomy [a prior model used to organize the IT group], the relationships remained….I already know people [in ISE]. For example, some people in [competency D] used to work for me….And connections with the business units goes through all levels via networks….My close friend works directly for [business unit A]…and other friends are managers in that organization too.

Informal networks were especially important in the months after ISE's founding, prior to the launch of the VC Cafe. During that time, teams typically formed on an ad hoc basis, with geographic proximity and existing connections from the old IT organization largely determining who worked together. In describing his first project at ISE, one project manager noted, "The two guys on either side of me—they were both on my team." And a first level manager told how people who already knew each other and were interested in the same topics came together to form a team in these early months, a process he described as "natural and reasonable."

Even after the introduction of the VC Cafe, which formalized the process of creating teams and selecting their members, informal networks were very helpful in accomplishing day-to-day work. A phone call to the right expert could often quickly resolve seemingly daunting problems that arose on projects. Knowing which expert to call—and having confidence that person would respond favorably to the request—was a valuable asset to any ISE research team.

Not everyone was equally plugged-in, however, and for those who were not as well connected, the existing networks could seem imposing and difficult to break into. One individual contributor described how it looked from the outside:

> There are lots of people…who have worked together for a long time….One could feel a little out of touch…it can be a little intimidating.

Impetus for cross-disciplinary work vs. tendency to stay inside technology groups

Two conflicting impulses—an impetus to undertake cross-disciplinary research and a counter tendency to work within the small groups—were competing within ISE throughout its two years of operation. This tension was especially strong at the outset and revealed differences between ISE's officially-stated posture, as expressed in its charter and in statements by ISE Staff, and actual practice within the groups.

Official mission—ISE as haven for cross disciplinary work

ISE's officially articulated position came down on the side of cross-disciplinary research. The charter spoke of ISE as an "organization that deliberately mixes technical specialties and experience levels rather than an organization with a single area expertise." As ISE's general manager put it, "We don't want to build silos. We feel most breakthroughs come about when you mix and match people with different kinds of expertise." A member of the ISE Staff put the point even more sharply, saying, "We should be spending a majority of our time on cross-competency projects, rather than having managers say, 'I control what my people do.'"

Others inside ISE explicitly espoused this perspective as well. One first line manager exemplified the stance when he said, "The vision should be to have ISE be successful, not to focus on whether this group or that has something better." And over time, as cross-disciplinary projects were launched, and people gained experience working outside of their small groups, more of the organization came to embrace this point of view.

Contrary practice—Focus on internal work

But a strong undercurrent in ISE ran in the other direction. Some parts of the organization operated on the assumption that the groups inside the competencies retained a first claim on people. From this perspective, internal projects undertaken by the groups were the default standard, while cross-disciplinary projects that called on talent to be deployed outside the group were viewed as an exception to the rule.

One prominent manifestation of this tendency was the inclination of some of the small technical groups to work on projects that dealt exclusively with their technical realm, staffed solely by internal people. Certain groups were quite insular and worked almost exclusively on internal projects. One first-level manager described these kinds of groups:

> People with similar interests came together, and they can become very narrow….They come up with all kinds of ideas for projects in that area….People get almost too stuck on what they're doing….[they] get involved in their [area] and don't even look outside."

This attitude was evident in the terms used by some groups to refer to external projects, which indicated such efforts were seen as a low priority. For example, the member of a group that worked predominantly on internal projects commented, "There are things we have to do, like when they [ISE Staff] insists we put someone from our team on something—when they want a representative from each of the silos."

Another manifestation of an inward-looking orientation was when first-level managers blocked their direct reports from being staffed on cross-disciplinary projects because they had already had a full slate of assignments within their technical area. A first-line manager related the difficulties a project manager had when trying to staff a cross-disciplinary project:

> The VC Cafe presentation called for people in these different competencies. The [project leader] assumed he would get people from the specific sub-competencies. But the [technical group Z] manager said no.

Conflict also arose when individual contributors wanted to get involved with external projects and were prevented from doing so because their managers wanted them to work on internal projects. A member of one group described how such a situation developed when a post-VC Cafe project was being staffed:

> There were some people from our group who wanted to get involved. But with one guy, [our manager] didn't want him to get involved. The guy was ticked off….Our manager said, I don't want that many people involved from our team….My guess is he had ideas for this person and didn't want him to be tied up in other projects.

Another individual contributor directly voiced frustration about not getting assigned to external projects: "I found [cross-disciplinary] projects I was very excited about, but I wasn't able to get involved. I couldn't without the support of my manager….I was told I was needed in my group."

Conflicts also arose when first-line managers held leadership roles on internally-generated and staffed projects. In such situations, the manager's ideas about how best to do the project could differ with their direct reports' sense of how they could best contribute and how the project fit with their larger career aspirations. The direct reports in such groups could find that their manager, who was supposed to serve as their mentor and forward their career development, now had an agenda that was not aligned with those goals. People caught in this circumstance felt the conflict of interest keenly. One individual contributor described such a situation.

> I've been telling my manager for a while what kinds of things I want to work on. And so on this project I zeroed in on a specific thing…I was told that was something I can do on the side if I really want. And instead I got assigned something that they said was 'really concrete, something you can really get your hands dirty with.'…Our definitions of 'getting your hands dirty' seem pretty different. I want to get into bits and bytes….But this is the person who's evaluating me.

Yet another manifestation of the persistence of practices and attitudes from the functional organization was a widespread concern over how people and groups would get credited for their work. Some managers focused on internal work as a way to make sure their group was seen as contributing. An individual contributor noted, "Different managers want different amounts of credit. Some really want to have credit accrue to their group….There's a lot of emphasis on who gets credit and what group it is." The industry slowdown and pending merger with Compaq only increased concerns over credit; anxiety about potential future job cuts led to heightened awareness of how individuals and groups were being perceived. The member of one group, which contributed many of its people to projects initiated by other groups, expressed particular concern just before the merger was due to close. "We have no projects of our own. If we're not producing papers, we're seen as not doing anything."

Successes in facilitating cross-disciplinary work

ISE Staff saw the tendency to work inside technology groups as a continuation of legacy practices inherited from the old functional organization. The Staff even developed a short-hand hand term—"muscle memory"—to describe behaviors that represented a continuation of old practices. But the Staff did not believe they could simply mandate away the existence of such behaviors. Given ISE's mission, it was heavily dependent on knowledge held by its technical experts. The Staff realized that such people could not just be slotted into projects on a command-and-control basis. Getting the best results from the organization's skilled knowledge workers required getting people involved with projects they were interested in and committed to, a process that frequently involved courting and cajoling. One first-line manager noted that attracting good people was one of the key challenges in getting a new project off the ground:

> You want to generate things that…create energy. It's very project and people dependent….Getting interest, that's a fairly major thing. If a project's interesting enough, individuals will turn discretionary time toward it.

So rather than outlawing work inside the groups, ISE Staff instead simply encouraged cross-disciplinary research, gradually and persistently. Over time, their efforts had an impact.

Development of ISE-wide social capital

The introduction of the VC Cafe led to the creation of a new set of cross disciplinary networks. The ISE Staff sometimes introduced VC Cafe participants from different groups who had similar interests. For example, the Staff merged two teams that made VC Cafe presentations on peer-to-peer technology and funded a joint project on that topic.

First-level managers assumed a key brokering role in the staffing of cross-disciplinary teams, for both VC Cafe and later projects, talking frequently with project leaders who were seeking people and conferring often with their peers. This activity had the effect of creating a new intra-ISE network among the first-level managers. One of them described how newly formed linkages underlay the staffing process:

> An engineer says, 'Hey, I really want to do this'…or [project managers] come to me and ask for help.

Another told how both long-standing and newly-created connections played a role:

> We [first line managers] talk often, and I already know people….I might ask for a person by name, and their manager might say that person doesn't have any bandwidth. If that's the case, then I'd say, Do you know anyone else?…Or people will present projects to staff, and other managers at Staff will say, You'll need this, or, We have someone who could contribute. Everyone's proactive…For example, [project T] was presented at VC Cafe and they said they needed resources and asked who would be willing to provide someone. We knew it would be crossing over into our [technology area], so I got a volunteer. Another project needed someone with [technology Y] experience, so I assigned someone coming off another project.

A project manager described how the process worked from the perspective of the party seeking talent:

> I got approval [for a new project] at the [ISE Staff] meeting and told managers I'd be calling. Some of them in the meeting said, So and so is available. And I told a guy I knew, and he asked his manager….Then I called around, and managers would say, I've got someone….So I had to call those people up and ask if they wanted to get involved….And then a few people found out about it and called me—their managers told them and they inquired.

The staffing process also led to many interactions between project leaders launching new research efforts and individuals interested in participating. A set of simple technology tools enabled these interactions—a broadcast email was sent to everyone in ISE announcing the new project's launch, and individuals could express interest by sending an email response or getting in touch by phone, with a Web-based tool used by project leaders to manage the email responses.

Even when these interactions did not result in people getting staffed on the new project, they did lead to people inside ISE with potentially overlapping interests getting acquainted with one another. One member of the ISE staff approvingly described these interactions as "conversations that wouldn't otherwise occur."

Other kinds of new networks also emerged. Peer reviews, technically-oriented reports on progress-to-date of ongoing projects, attracted a cross-disciplinary group with an interest in the staying on top of new technologies being developed and tested inside ISE. People from different groups who worked together well on one project would often get assigned together again on follow-on or new efforts; for example, two groups within one competency developed a close and effective working relationship. And a group of recent hires at one of the major hubs, all of whom worked in different technology areas, banded into an informal group that often met for lunch. At these lunches they traded stories about the projects they were working on and other activities that were going on inside their groups, which proved to be a highly effective mechanism for spreading knowledge across disciplines and projects.

Working across disciplines and rank

ISE launched a number of cross-disciplinary projects were launched, both during the VC Cafe and afterward, and several of which resulted in innovative findings that had significant influence at high ranks of the IT organization. This was the most appropriate benchmark for gauging ISE's success—the time frame of study was too short to measure long-term impact on HP's IT practices. Both ISE Staff and researchers involved with these projects credited the teams' cross-disciplinary composition with a good measure of the creativity and innovativeness that resulted. One member of ISE Staff reported that "most of the really good ideas that came out of the VC Cafe were from people who weren't responsible for that content area." Team members themselves also reported that getting assigned to cross-disciplinary projects was more interesting than working on projects focused on a single technical area.

Allowing individual contributors to "bid" to get assigned to new projects that interested them also proved for the most part to be a well-received innovation. The talent "markets" cleared quite well on VC Café project. All those who expressed an interest in a project were able to get assigned to it on at least a part-time basis on for between 70 and 90 percent of the new studies launched through the VC Cafe. On a few occasions, interest in projects among engineers in ISE was low, and the Staff read this as useful information. In some of these instances, they shut the projects down; in others, the sponsor pushed to recruit people to the effort and it went ahead.

Anecdotal evidence also suggested that the new staffing processes resulted in a better fit between people's interests and the work they were doing. One first-level manager commented on the "good balance between preferences and assignments." And several individual contributors who were proactive on their own behalf and had accommodating first-line managers were consistently able to get assigned to projects in areas that were of interest. Some managers became adept at responding flexibly to staffing requests that arose on-the-fly from outside groups

A first-level manager described how he juggled the trade-off between his group's internal efforts and external projects:

> Our group is kind of across the board…and everyone seems to want to plug into our knowledge as a utility…I know my [internal] priorities, but I'm willing to shift gears. I talk with [the other managers], then decide what I'm going to table, put on the back burner.

ISE was also able to mix-and-match people on teams without strict regard for position in the management hierarchy. A comment by a first-line manager is illustrative:

> I'm an individual contributor on one project, and a guy who works for me is the project manager. I do his evaluations, and he gives me assignments on the project. It's fun if you're not hung up on titles, if you don't put your self-worth on always being the manager.

This was not an isolated instance, and individual contributed noticed and commented, frequently and favorably, upon this subverting of traditional hierarchical roles in ISE project assignments.

In all, there was a steady move over the course of ISE's existence toward cross-disciplinary work. As one first-level manager noted just before the merger, "The groups have been moving more and more in that [cross-disciplinary] direction." Another described how this process worked for his group:

> ISE was silo-ized at first, but it's getting better…The networks are…forming now. I can see [my direct report] talks to [another first level manager's] group now, they're getting a relationship going. It's because we had a common project, so there was a common problem they were working on, and they got to know each other, and now there's a connection.

Variations in practice among the technology groups

While there was an overall move toward greater cross-disciplinary work within ISE, this did not reflect a uniformity in practice across the organization. Rather, adoption of project-based organizational practices varied significantly across ISE. The interviews conducted for the study uncovered data on the practices that prevailed approximately a year-and-a-half after ISE's inception. They showed considerable differences in how the small groups within the competencies operated.

Three modes of operating: Mini-labs, Lead operators and Hybrid

The study allowed us to examine closely the working of 9 of the 12 groups with ISE's three competencies. We learned that these groups operated in 3 primary ways—as Mini-lab, Lead operator or Hybrid.[1]

- *Mini-lab*

  These groups worked primarily on internal projects related to their area of technical expertise (see Figure 1). The name "mini-lab" describes this practice; these groups operated like small labs undertaking research within their technology realm. Only a small minority, between 10 to 20 percent, of the available time of members of such

groups was allocated to external projects. 3 of the 9 technical groups tracked closely in the study worked in this manner. The mini-labs tended to be composed of respected experts who had deep knowledge in their technical area, who in some cases had worked together in the functional organization, with former reporting relationships sometimes carrying over into ISE. In addition, these groups tended to have well-established relationships with other HP units, which were either internal customers for their research or collaborators in that work. An engineer who worked inside one of the mini-labs described the importance of these relationships:

> Two of the people in our group do a lot of work with HP Labs, and we also work with [External Company A] and other companies active in [our technical area]….I would emphasize how much the relationship with our [internal] customers droves things…We were focusing on the areas we were because of customer relationships.

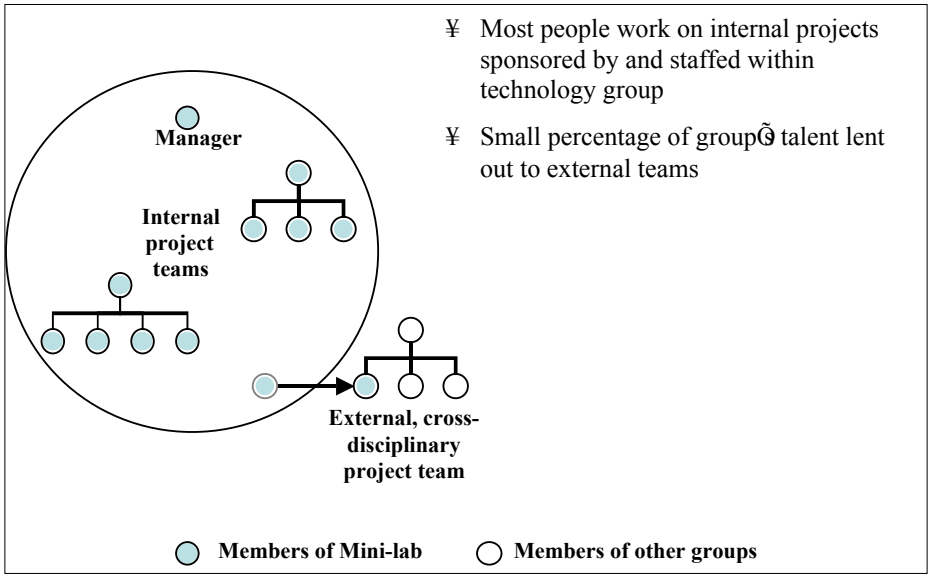

Figure 1: Mini-lab

· *Lead operator*

Leader operators were groups that championed large, cross-disciplinary projects (see Figure 2). The name comes from brokers in the Web design/multi-media sector who obtain contracts from customers and pull together groups of e-lancers to do the work (Gareis 2001). Lead operators in ISE developed ideas for large project, usually based on prior ISE research or the themes articulated by ISE Staff, then obtained funding and staffed and ran the projects. 2 of the 9 technical groups tracked in the study worked this way. Although lead operator groups championed cross-disciplinary projects, members of these groups were deployed much as people in mini-labs were. Members of lead operators ended up working on the large projects launched by their groups; only 10 to 20 percent of these group's available time was allocated to projects initiated by others

groups. Internal talent from the initiating group usually comprised over half the members of large, cross-disciplinary project team, with people from other groups in ISE and other HP units accounting for the remainder.

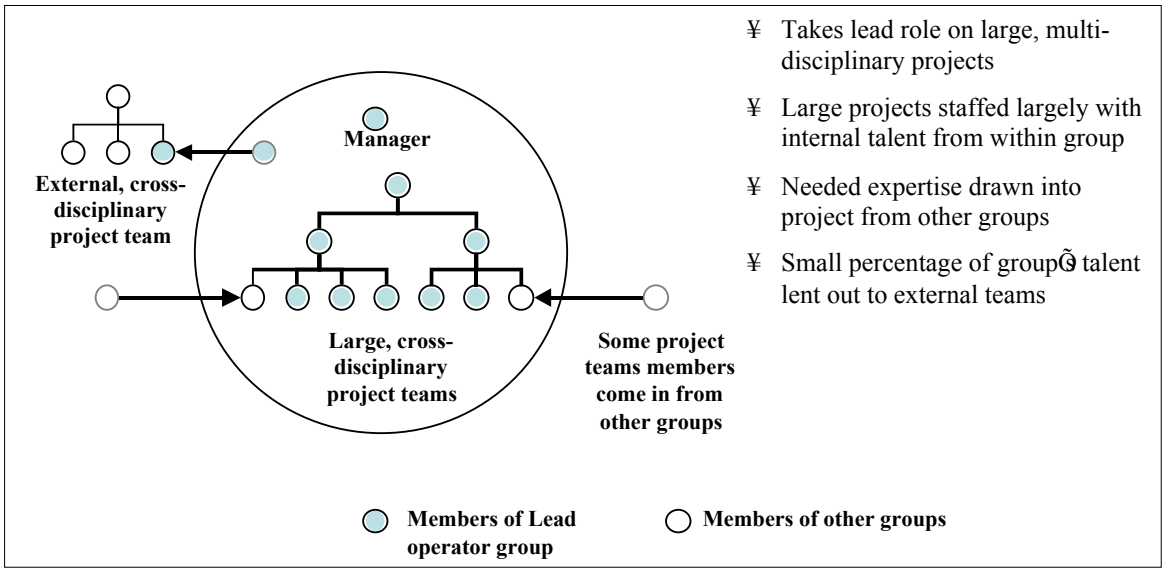

Figure 2: Lead operator group

· *Hybrid*

The groups that operated as hybrids lent out some of their people to work on cross-disciplinary projects sponsored by other groups, while other members of the group worked on internally-initiated projects (see Figure 3). In hybrid groups, 40 to 50 percent of the available talent was typically assigned to cross-disciplinary projects initiated by other groups. 4 of the 9 groups tracked closely in the study operated in this way. In 2 of the hybrid groups, people who were more junior and had yet to develop deep expertise in particular areas were frequently assigned to work on cross-disciplinary projects, while people with more experience, who had developed deeper expertise in their technical realms, tended to work on internal projects. A first-level manager in one of these groups described this distinction explicitly:

> In our area we have some very specific technology experts. We control what those folks do within their discipline. Then we have folks who have a breadth of technical skills.

In the 2 other hybrid groups, decisions to assign people to internal vs. external project was typically made more on a case-by-case basis, driven by the demand for talent that arose as new projects were launched and by the preferences and career aspirations of individual contributors in the groups.

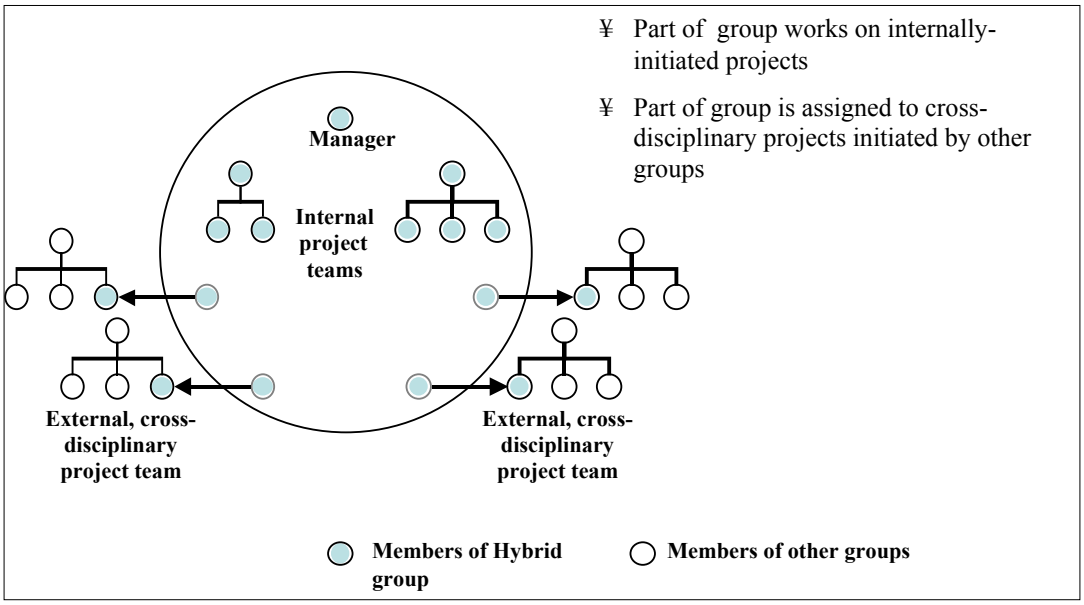

Figure 3: Hybrid group

While undertaking the study, we also posited the potential existence of another kind of group—a talent pool—one that would undertake little or no internal work, but instead, keep most of its people available for assignment to external projects. But we did not find any groups in ISE operating in this way.

Factors behind variations in group practice

To a great extent, the variations in group practice reflected different rates of persistence of legacy organizational practices. The mini labs were still operating much like functional units inside the old IT organizations. And while the lead operator groups played an important role in promoting cross-disciplinary research, they still deployed their people like a captive internal talent pool, much as the old functional units did. Several factors shaped the rate at which the new practices were adopted.

One was the extent to which pre-existing social networks overlapped with the technology groups that were set up in ISE. Several of the groups were comprised of people who had worked together closely in the functional organization. Groups with such established ties tended to continue working together as they had before in the functional organization and so were likely to operate as mini-labs.

Another variable was the length of time required to hand off old operational responsibilities. Groups in one of ISE's competencies retained their former legacy duties much longer than the others. As a result, these groups were resource-constrained and therefore reluctant to commit to their people to cross-disciplinary projects initiated in other parts of ISE. The member of one such group described its situation: "Everyone's still getting their services transitioned. So most people are hesitant to get into [cross-disciplinary] projects."

Another important factor was the nature of the technologies with which a group worked. Some groups were working in relatively self-contained technical realms and could undertake research in their area without needing to consult with people in other disciplines. Other groups, by contrast, had to collaborate across disciplines to do effective work. As the head of one of the competencies put it,

> Our areas of technology are not stand-alones. But some technologies you can you can do as stand-alones….So some of it's the character of the technology.

An individual contributor described being part of a group that worked with one of these interdependent technologies:

> We don't have as many projects come out of our group—but lots of projects need a component of what we know.

Groups working with stand-alone technologies thus tended to operate more internally, while those assigned to interdependent technologies were more involved with cross-disciplinary projects.

A related factor was the kind of talent assigned to a group. Groups comprised mostly of experts with highly specialized technical skills tended to work more internally. Some of the groups with less experienced people, who possessed more general skills, assumed a lead operator role, by generating cross-disciplinary projects, or worked in the hybrid manner, by contributing their generalist talent to cross-disciplinary projects initiated by other groups.

A final key factor was management structure and style. These differences existed both across the competencies and across the technical groups within the competencies. One competency, for example, had a wider span of control that the others, and its first-line managers there were inclined to keep somewhat tighter control over their people's activities. Groups in this competency tended to work more inside and less externally. By contrast, the leader of one of the other competencies had a strong commitment to cross-disciplinary work, and this orientation reached down into the ranks. The groups within that competency tended to be less focused on internal work, and instead, actively sought to get involved with cross-disciplinary projects and more freely contributed their people to projects initiated by other groups.

Differences across first-level managers were also important. Their practices varied significantly, as noted by one individual contributor: "My manager looks outside a lot more than others; other managers are looking more internally….Some managers push for people to have internal projects; ours doesn't." Differences between managers on this question were part of a larger set of variations among the first-line managers on a range of issues.

Variations in managerial style

To better understand the differences that existed between first-line managers within ISE, it is useful to discuss the range of responsibilities assumed by them and the variety of ways they undertook those duties. There were four major categories of activities that managers engaged in (cf. Mohrman *et al*. 1995, chap. 5). The first was task management, which was comprised of several sub-areas: developing a research agenda for a technical group; assigning direct reports to

projects; and assuming leadership roles of various types on internal projects; and. The second major category was performance management/coaching, which included such activities as providing ongoing feedback, doing year-end evaluations/next-year performance plans and assisting direct reports with long-term career development. This category also included efforts by managers to build a sense of community inside their groups. These first two sets of activities comprised the core work of first level managers. But managers also undertook two other kinds of activities: they served as ambassadors, linking project teams or their groups as a whole with ISE Staff, other HP units and other firms in the high-tech industry (Ancona 1990; Ancona and Caldwell 1992). In addition, some managers also worked as active technical contributors on research projects.

Five managerial styles

Managers prioritized the four kinds of activities in different ways and exhibited a range of approaches to undertaking them. The interviews revealed that managerial practices fell into five clusters; the most important variables were the amount of control managers exerted over their direct reports' project assignments and the extent to which managers made coaching/community development a priority. We termed these clusters managerial styles and named them: Directive, Laissez faire, Lead researcher, Facilitator and Talent agent (see Figure 4).

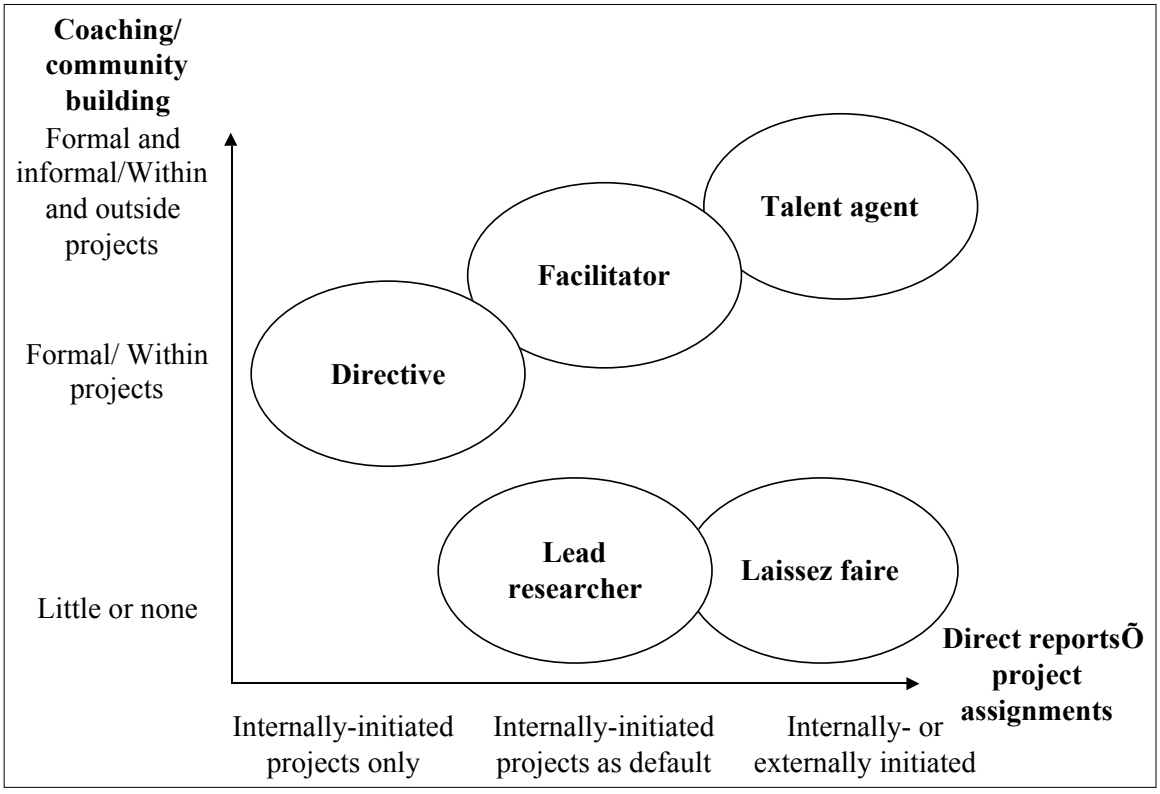

Figure 4: Styles of first-level management in ISE

· *Directive style*

Managers who employed a directive style operated somewhat like line managers in a traditional functional organization—they marshaled their direct reports to accomplish a set of internally-defined objectives. 2 of the 9 managers observed in the study operated in this manner. They used group-wide brainstorming sessions to establish a research agenda in their technical area and then deployed their direct reports to accomplish that agenda. Such managers also proposed cross-disciplinary projects and got funding for them, with their direct reports making up the core of the team. Direct reports in these groups often expressed their wish to work on external projects, but were not given the go-ahead to do so, instead getting booked exclusively on internally initiated projects, thereby serving as a captive talent pool. While not officially serving as project managers, first level managers in this category exerted great influence on projects, either assuming sub-team leader roles or operating as "de facto" project manager behind the scenes. Managers with a directive style were conscientious about doing formal performance reviews and holding regular team meetings. But they sometimes expressed skepticism about the value of coaching and community building that occurred outside of the project context, and their direct reports did not find directive managers especially helpful in providing career guidance. These managers' ambassadorial work was focused primarily on managing relationships with ISE Staff, the group to which they formally reported.

· *Laissez faire style*

At the other end of the spectrum from the managers who exhibited a directive style were those who operated in a laissez faire manner. 2 of the 9 managers tracked in the study exhibited this style. These managers basically left their reports alone. On the one hand, they allowed their people a great deal of freedom to work on projects that were of interest to them; on the other, they placed a low priority on coaching and community building. While one of the managers in this category provided some day-to-day advice and feedback on performance, the other did not, and neither invested a great deal of time in formal performance evaluation and career planning for their direct reports. In some instances, they missed deadlines for evaluations; in others, they obtained most of the information from the direct reports themselves. Similarly, team building was not a priority, with group meetings held infrequently, or not at all. When such meetings were held, the time was spent almost exclusively on discussion of current project work. Managers exhibiting this style tended not to assume a direct or indirect project management role, though they did serve as "roadblock removers" when difficulties arose. In one instance, the manager had extensive ties outside ISE and served as an ambassador for the group to these external constituencies. These managers also tended to work as technical contributors on projects. Experienced individual contributors who had

established networks and knew the HP organization well responded favorably to the high level of autonomy they held under laissez faire managers; but newer hires who had a greater need for coaching and advice often had a difficult time under such managers.

· *Lead researcher style*

Managers who employed the lead researcher style combined attributes of the directive and laissez faire managers. 2 of the 9 managers observed closely in the study operated in this way. These managers dedicated a portion of their group, sometimes the most experienced members with the deepest expertise, to an internal research agenda. The other members of the group, in some instances the less-experienced generalists, were allowed to work on whatever projects interested them—and that they could get assigned to. These managers did not place a high priority on coaching and career development. They did not assume a direct project management role, but did play a role as overseer of the slate of projects tied to their research agenda. They would also occasionally serve as roadblock removers for project teams, as described above. The interviews did not reveal these managers playing a significant ambassadorial role outside ISE, though they did manage the relationship with ISE Staff.

· *Facilitator*

Managers who exhibited a facilitative style gave their direct reports considerable freedom in connections project assignments; at the same time they were very hands-on with their coaching and community building activities. 2 of the 9 managers observed closely in the study operated in this way. One of these managers developed a detailed research agenda but was flexible when opportunities on external projects arose for direct reports, even when this created a need to change alter the internal plan. The other manager of this kind allowed the group's agenda to emerge out of the slate of project work that emerged at ISE, with a goal of finding "projects to engage my team." On projects, these managers allowed projects manager to direct their teams, occasionally stepping in to serve as "roadblock removers" in much the same say as some of the hands-off managers. In this role, their ambassadorial skills came into play, as they frequently made introductions to other units in HP or other firms in the high tech industry. In addition, they sometimes played a behind the scenes role as what they called "influencers," communicating about a team's progress with ISE Staff or customer units within HP. While they allowed their direct reports to work on external projects when there was a convincing case for it, they tended to see internal projects as the default option, and wanted to maintain final approval authority over their direct reports' assignments. In one case, the desire to maintain control was out of concern that in their eagerness to sign up for interesting projects, direct reports might get overloaded with work. These managers were systematic and thorough in their coaching activities, holding frequent one-on-one meetings and

adhering closely to formal evaluation and career development processes. They also worked hard to create a team atmosphere in their groups. They tended to play a limited technical role on projects, serving primarily as advisors and trouble shooters.

- *Talent agent*

The one manager who exhibited the talent agent style was much like the facilitative managers, but emphasized coaching and community building even more. This manager did not view internal projects as a default, but instead, was truly agnostic on the issues of internal vs. external projects and spoke enthusiastically about moving people around on a mix-and match basis. This manager developed a careful group research agenda, but also realized, "The plan is probably not what will come to pass." This manager held frequent group meetings and used new technologies in particularly creative ways to overcome geographic and temporal barriers. The primary difference between this approach and the one employed by the facilitators was one of degree—more openness with regards to external projects, more intensive coaching and team building within the group.

Factors behind variations in managerial style

The ISE charter explicitly defined the first-level manager position in a way that contrasted it with the manager role as it existed in the functional organization. The new definition emphasized people development and the ability to allocate and evolve a portfolio of skills. ISE's general manager underscored the differences between the old and new roles, pointing out that project managers and first-level managers in ISE were charged to optimize different things. Project managers, much like line managers in the functional organization, directed a team's efforts and were expected to deliver results. The ISE first-level manager was envisioned as more of a coach and broker, whose mission was to develop people, match skills with needs and cultivate a pool of talent, calibrating the makeup of that pool on an ongoing basis against the larger organization's needs. ISE Staff initially considered adopting the title "talent agent" for the organization's first-level managers, based on the parallels between the manager role they envisioned and the assistance Hollywood agents provide to their stables of actors, writers and directors. This idea was revived in the design of the second generation enhancements to the staffing process—the final design referred to first line managers as "talent managers."

Despite these efforts to redefine the manager role, many aspects of managerial practice inherited from the functional organization continued in ISE. Most first-level managers had risen to their positions based on content knowledge and project management skills. The talent manager role, by contrast, was more intangible. In some respects, the move from line manager in the functional organization to talent manager in ISE was akin to the move from closed-form technology work in the former IT group to the open-form questions that were addressed by ISE.

In the face of this change, some managers in ISE fell back on the old assumption that they were responsible for delivering results against the pool of resources assigned to them. An individual contributor described this approach:

> A lot of managers try to manage the vision for their silo and manage the people in their silo. They're leveraging people and managing them to meet that vision.

Another manager explained the impulse behind this stance:

> It's a natural reaction. Your name is x. We must be in charge of that and we're going to be measured by how much happens in that space.

In this way, the inherited mindset, which said that managers were responsible for directing their reports to achieve an agreed-upon set of objectives, contributed to the tendency to work inside technical areas.

The new processes and tools introduced in ISE created a set of additional challenges for managers, in many ways further undermining the traditional managerial role. Managers in the functional IT organization effectively had control over a pool of resources—their direct reports—and were responsible for delivering results—for example, a certain level of network performance, the fielding of a new desktop software application—by making use of those resources. In ISE, managers no longer had full authority over all their resources; in instances where one of their direct reports was assigned to an outside project, the project manager assumed the day-to-day line authority for directing that person's efforts. When carried to the extreme, with a first-level manager's entire roster of direct reports being assigned to outside projects, that manager would end up "managing" no one, in the traditional sense of directing their work on a daily basis. One manager showed awareness of this reality when he noted, "If you put into place the free-flowing movement of talent, the managers lose their little groups."

Early on in ISE's history, the Staff also took away first level managers' budgetary authority for items like equipment purchases. As one member of the Staff put it, "We didn't want them to be thinking about that as one of their criteria…They should be looking at things on their merits." Such expenditures accounted for approximately 30 percent of ISE's total costs. While the decision was ultimately validated—decisions did get made "on the merits," and requests for non-salary expenditures to the Staff stayed within budget—the removal of budget authority was another factor that led managers to feel their former authority had been undermined.

The second generation enhancements to ISE's staffing processes extended and formalized a new set of approaches, begun with VC Cafe, that undercut even the more limited first-line manager brokering role. The enhanced process encouraged direct conversations between project managers and individual contributors, without any need for first-level managers to act as intermediaries. One first-line manager recognized the implications of this development, saying that the new processes were

> distributing a lot of the management responsibility into the organization, moving it onto project managers and individual contributors.

These changes had the potential to lead some managers to feel that their old sources of prestige were being even further eroded, that they had "lost their stripes." Most of people who were first line managers had achieved their positions under the set of rules that prevailed in the functional organization; the new practices being followed in ISE represented a major change in those rules. This created the potential for disillusionment, of a sort not unlike that felt by people when post World-War Two employment contract was breached in the corporate restructuring of the 1990s (Laubacher and Malone 1997; 2000).

Thus ISE's first-level managers found themselves in a novel, hard-to-define role, with many of the old prerogatives they associated with their position being undermined by a continual barrage of new practices. In the new organization, project managers had assumed much of the responsibility for directing day-to-day work that had formerly been the province of first level managers. A small number of first level managers, typically the most experienced and confident, were able to ride these waves and carve out a new role. But it is not surprising that many in this situation fell back on familiar, directive approaches that they'd long seen used by other managers in HP or withdrew into a hands-off stance.

Impact of enhanced staffing process

At the time the enhanced staffing process was launched, ISE was thus in the midst of the transition from the legacy practices inherited from the functional organization and new forms of cross-disciplinary, project-based teaming. Significant variations existed in how far the various groups within ISE had gone along this transition path. The enhanced staffing process attempted to augment and extend practices initially put into place in the VC Cafe.

Implementation of enhanced staffing process

The enhancements to ISE's staffing process were put into place in January 2002 and stayed in effect until the HP-Compaq merger closed in June. In the enhanced process, project managers and individual contributors, aided by the new individual skills profiles and more detailed project profiles, contacted one another directly and had initial conversations about project assignments. While first-level managers still had to approve actual assignments, their official role as go-betweens making introductions was reduced, potentially even eliminated.

ISE launched a limited number of new projects during this period. ISE Staff's decision to focus on a handful of leading themes in mid-2001 led to number of larger projects being launched in late 2001. During the first half of 2002, uncertainty about the impending merger then resulted in a number of new project launches being deferred. Because of these factors, the study was able to observe the workings of the enhanced staffing process for only 3 projects; and in one of these instances, only the preliminary steps were taken, because the project launch was ultimately delayed until after the merger. To give a sense of perspective, during the first half of 2002, the total volume of projects ongoing at ISE numbered approximately 35.

The enhanced staffing process met a perceived need. In the survey conducted by the design team, over half the project manager respondents indicated that they did not have the visibility they would like into the talent within ISE. Similarly, over half the individual contributor respondents reported not having adequate visibility into which new projects were being launched. The detailed interviews confirmed these results. One first level manager commented,

> It's a lot bigger resource pool than I realized. I don't necessarily have a depth of understanding about all the resources.

Another first level manager spoke about the advantages of having access to talent from all of ISE, as opposed to one group only, noting the pluses of "drawing on 99 people instead of five." And a project manager was intrigued about the potential capabilities of the skills database, saying,

> It would be interesting to see who comes up given specific criteria. It would be useful for me as a PM—that would be great.

As noted earlier, more experienced and aggressive individual contributors with amenable first-line managers were able to get assigned to external projects that interested them. But individual contributors with less well-established reputations and networks, especially more recent hires, and people whose managers who were less open to having them work outside their group, had a difficult time getting staffed on outside projects, even when they expressed strong interest. This group was especially enthusiastic about the new processes. As one of them commented, "It's a good way for [us] to get visibility."

Impact of enhancements

In the cases where it was used, the enhanced process proved to be a successful extension of the staffing innovations already in place, providing more information to the parties involved, thereby opening up staffing opportunities to more people and creating the potential for an even better fit between preferences/skills and needs. In the best documented case, the new approach complemented old practices. Managers still played a role in notifying people about coming projects, but project managers and individuals also used the skills database and project announcements to make direct contact with each other.

The project manager in this instance found 12 people from the database, and 2 more responded to the project announcement. According to the project manager, the database had value as a one-stop shopping destination. It was particularly useful to this project manager, who worked in Europe, because it helped in locating talent across time zones. This project manager also lacked a well-established network, so the database was useful in notifying him about people he would not otherwise have known. He encountered some problems caused by the newness of the database and the unstructured character of the profiles. Not everyone in ISE had yet entered profiles, so coverage was less than complete, and the open text format led to inconsistency in profile layouts and created some difficulties in comparing candidates. This project manager also

expressed a wish to know about prospective candidate's availability, a feature that was not included in initial profiles.

In the end, some people were staffed on this project via a suggestion made by a first-level managers, as was typical in the old process. But with the new process also facilitating direct conversations between the project manager and these prospective team members. One of the individual contributors involved described how this worked:

> I was talking to [my manager] about life after [project Z]. He said this project might be coming out. Before I had a chance to talk to [the project manager], he sent out an email….We exchanged emails after the announcement, he said, Let's talk on the phone. We talked for a half-hour. I have a pretty good sense it was okay, that I was on the team….[After that], in my one-on-one, I talked to [my manager] about it.

In other instances, connections made through the project announcement and skills database, without a prior managerial referral, led to people getting staffed on the project. As one first-level manager put it, "Several people in my group were staffed on [the new project] due to the skills database." He went on to describe how this happened:

> I got a phone call from the project manager and…he said, I've talked to two of your people about working on my new project, but they're assigned to other things. I talked to those people and found out…who really wanted to work [on the new project]. The people [the project manager] wanted were willing and interested…so we reshuffled some work…rewrote their performance plan.

Even though the database served to make the introduction, human networks played a role in verifying reputations. Prior to the assignments being finalized, the first-level manager who supervised the project manager contacted an old colleague who was now working an HP unit in Asia, and who knew the two individuals identified via the database. The Asian contact vouched for the two researchers capabilities, and the project manager could confidently bring them into the team.

The new process was not without controversy. When the project manager sent out the new project announcement to everyone in ISE, he received several responses from people asking why they were included on the mailing list, implying that sending the announcement was the equivalent of spamming. Despite a significant amount of communication about the new processes prior to them being put in place, a significant group within ISE who were focused on internal projects found the announcement of a new, external project irrelevant at best, and a negative distraction at worst. On person attributed the negative reaction to the lack of manager involvement in the new process:

> [The project manager] launched the project trying to follow the new staffing model. People emailed him back saying, Why did you sent that out? It's the first time it was done like that, so people didn't know what to think. Part of the problem was that it didn't come from a manager….People were too busy, and they thought he was a renegade.

The HP-Compaq merger effectively cut short the trial of the enhanced staffing process. But the database of skills profiles created in the experiment proved to be a useful tool when the HP and Compaq IT organizations were being combined. As part of the merger, all IT units were requested to forward profiles of their people to the team working on the merger of the IT organizations; when this request came in, ISE already had skills profiles available for most of its people in the database created as part of the staffing process enhancement. A tool created for internal staffing purposes thus proved to have potential value as a post-merger tool. In addition, the combined HP-Compaq IT organization anticipated using processes that resembled ISE's staffing processes for making at least some project assignments in the post-merger organization. As our study came to an end, ISE Staff was exploring ways to share insights gained from the their experiences with the appropriate managers in the post-merger IT group.

Discussion

Its informal networks of technical experts were extremely valuable to ISE. These were the social groups where the specialized knowledge that made the ISE distinctive resided, and being able to mobilize that knowledge was a key to the organization succeeding. At the same time, there was a tendency for these networks to be too insular, to focus on topics pertaining exclusively to a particular technology, and to collaborate only with other experts possessing similar interests. And people who are not plugged into existing networks, who are not already part of the club, can be shut out, even when their skills and interests might make them appropriate participants on a project. To open up these networks, ISE Staff introduced a series of new project staffing practices the incorporated elements of e-lancing.

Internal e-lancing to augment existing social networks

Public e-lancing, as implemented in open project brokering Web marketplaces like guru.com and elance.com, combines three features. First is rich information about talent buyers' needs, provided through databases that list all open projects. Second is rich information about talent sellers' capabilities, provided through databases that list the skills and experience of the individuals and small firms who have registered with the marketplace. And third are protocols to enable interactions between transacting parties. These are the rules in place about processes like posting projects and placing bids, plus supporting Web tools, that enable sellers parties to express an interest in projects and present their credentials and that help buyers to manage the bidding and selection process.

The project staffing processes implemented by ISE included all these elements. Information about talent buyers' needs was provided through ISE-wide emails announcing the launch of new projects, with links to the project repository, which listed the kinds of expertise needed. Information about talent buyers' capabilities came through the skills databases, which had profiles of everyone of ISE. Finally, protocols to enable interactions between transacting parties were provided through project staffing processes which allowed project leaders and

interested individuals to have preliminary discussions to gauge initial interest and fit, as a prelude to negotiation between project leaders and first-line managers to make actual assignments.

In public marketplaces, e-lancing enables connections between interested parties who might otherwise have remained unknown to each other, due to barriers of geography and firm boundaries. In ISE, internal e-lancing enabled connections between people who might otherwise have remained in inward-looking groupings that sometimes had the characteristics of cliques. Figure 5 depicts two inward-looking groups in a traditional organization, where cross-group staffing can only occur if brokered by first-line managers. If a managers in such a setting were not open to cross-group collaboration, individual contributors could find themselves working exclusively on internal projects.

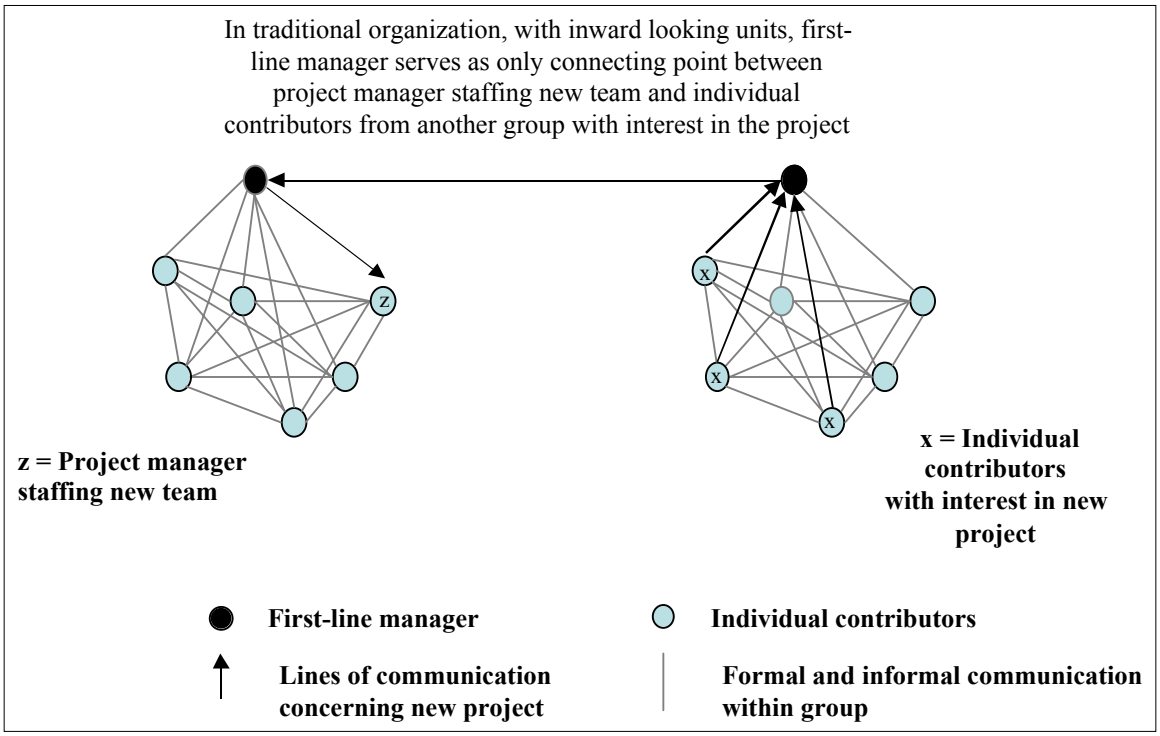

Figure 5: Inward-looking groups in traditional organization

The e-lancing inspired practices introduced by ISE encouraged connections between individual contributors who were in groups of this sort. Simple technology tools—email project announcements and Web-based project and the skills databases—notified people with potentially like interests of one another's presence.[2] The staffing process encouraged interactions between these people to take place. And while the first-level manager's approval was still required for actual project assignments to occur, the new processes created an environment where cross-group interaction was already occurring as part of the staffing process. The kinds of interactions that occurred as part of the ISE staffing process are depicted in Figure 6.

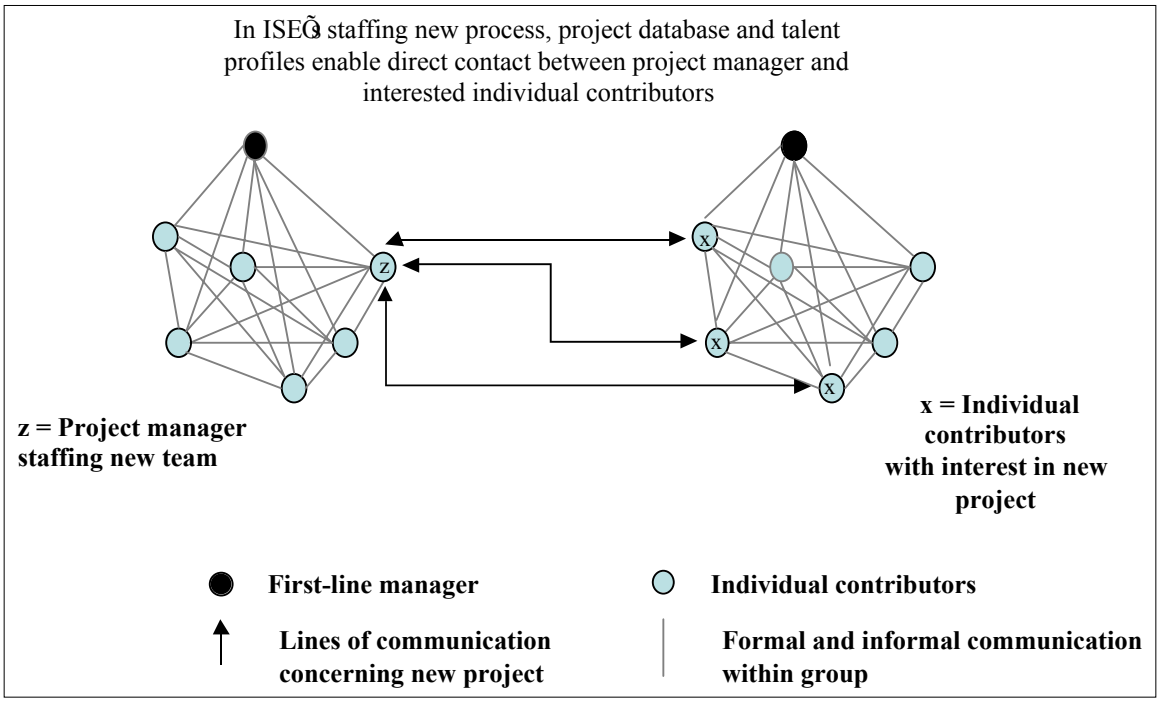

Figure 6: Interactions in ISE project staffing process

Technology tools—skills and project databases, plus organization-wide email announcements—and ISE's staffing processes encouraged interactions between people who weren't linked by existing networks, but who had common interests in a project or subject. The new tools and processes were an IT-enabled "introducer" system, able to create new kinds of "sociotechnical capital"—social capital enabled by information technology (Resnick 2002).

Information provided by electronic databases in e-lancing is not as rich as that which can be conveyed by the personal connections in human networks. But the advantage of e-lancing is its broader reach; and the price paid for that broader reach is less detailed information. This tradeoff can be addressed in two ways. First, better tools can provide richer information. Recent work on skills codification (HR-XML 2001), search (Klein and Bernstein 2001) and reputation certification (Dellarocas 2001) promises to improve the kind of information that can be accessed electronically in coming years. Second, human interaction can augment the incompleted information that is initially conveyed via electronic databases. In ISE, the conversations between project leaders and interested individuals served to augment the project and skills profiles. And once the system made the introductions, existing social networks proved to for tasks like checking reputations. Also, internal e-lancing is not subject to the same extreme risks as contracting for project talent through public marketplaces. People inside a firm can usually assume a certain baseline level of competence in their fellow employees. This was the case at ISE, and inside HP as a whole; in a similar context, other "HPers" have noted the inclination to cooperate with colleagues and sense of shared mission exhibited by fellow members of the firm (Cohen and Prusak 2001, chap 2).

An added benefit of internal e-lancing is that it gives individuals in the organization more say in what projects they work on. The traditional view of project staffing is that it is primarily a resource allocation issue for the enterprise. But in project-based organizations, the staffing process has important professional implications from the perspective of individual contributors. The projects people get assigned to shape their careers; in an organization that works exclusively on a project basis, a person's roster of project assignments effectively *is* their career. Project assignments determine an individual's day-to-day work experience, the people in the organization they come into contact with and the opportunities they have to develop new skills. When viewed from this point of view, project staffing becomes more than simply a resource allocation issue; it also has a major impact in such areas as retention and skills development.

Given the importance of project assignments for their future career development, individual contributors in ISE expressed a consistent desire to have a say in staffing decisions. They wanted to be able to work on projects they felt were a good fit with their skills and interests. And on occasions when managers blocked their efforts to get assigned to such project, individual contributors expressed frustration and disappointment. Given this, most individual contributors responded enthusiastically to the elements of internal e-lancing that providing them with opportunities to influence their future assignments.

New tools and processes are not enough

Making a transition to internal e-lance requires more than just implementing a new set of staffing tools and processes. The ISE experience shows that several additional elements are needed: establishment and reinforcing of common culture and standards by the leadership team; reframing of the first-line manager role; and the creation of internal guilds.

Common culture and standard practices

ISE's project self-organizing project teams relied on a foundation of common culture and standardized practices. When ISE was formed, the Staff spent a significant amount of time to work out an explicitly articulated charter that outline the organization's fundamental goals and operating principles. These goals and principles were then operationalized in the project selection and team formation processes embodied in the VC Cafe. Once ISE was up and running, the Staff continued to monitor the organization, to ensure that a common set of beliefs and practices was in place. When they detected a unacceptably wide variations in practice, they intervened. For example, when they discovered differences in how first level managers were evaluating their direct reports, they developed a set of principles on performance measurement and communicated them throughout ISE.

A common culture and the standardization of a handful of key practices can enable an organization to push a great deal of decision-making to front-line workers. Because they knew the overall objectives and high level modes of operating, and because common practices in such areas as staffing and project management were in place, ISE's project managers and teams had

wide discretion to respond to the challenges that arose in their specific research efforts, while still being able to work together as part of a coherent unit.

Reframing of manager role

The difficulty many managers faced in assuming the newly defined manager's role at ISE led to a falling back onto legacy behaviors from the functional organization, which were familiar and comfortable, or a hands off approach. Additional training and support could help to ease the transition. A manager's community, where the challenges of the new role transition could be discussed among peers, might be a potentially promising support mechanism.

But changes in the manager's role that come with the move to a project organization raise larger organizational questions. Could a talent manager role be a fulfilling one? How many such talent managers would an organization need? Specifically, would there be a need for as many talent managers in a project-based organization as there had been first-line managers in the predecessor organization?

ISE's managers were aware of these issues at some level, and their reversion to old patterns could have been due to a recognition that adoption of the new practices might lead to the elimination of the position they had striven hard to achieve. The manager who noted that the enhanced staffing practices amounted to "distributing management responsibility into the organization" saw the implications of such a distributed management approach:

> If that's the case, managers need to do something else or we need fewer….Some people will say this is empowering, that it will help managers make a contribution at a different level. Others will … see themselves as losing something they've worked hard to get….You might only need one or two people as talent brokers…I could see a mass exodus of managers out of ISE.

Hesitance, even resistance, on the part of managers under such circumstances is quite understandable. Manufacturing workers show a similar reluctance to cooperate with total quality programs when the success of such an efforts could result in job loss (Sterman et al. 1997).

There are several possible approaches for addressing this issue. One would be to use a smaller number of specialized talent brokers, who could focus exclusively on people development—finding assignments, making sure each individual gets the right kind of training, providing career guidance.

Another option would be to distribute the talent management work among the same number of managers as existed in the former functional organization and give them additional technical or project management responsibilities to make up for the reduced amount of managerial work. In considering this option, it would be important to think carefully about the skill sets required for the different roles; as the ISE case showed, the capabilities required to be a technical expert or traditional line manager are different from those required to be an effective talent manager.

Yet another possible option is the creation of additional roles, in project management or as technical experts, comparable to the talent manager role. The lab at another leading IT

company has created a technical expert track, with its own separate set of positions, comparable to those in the management track (Laubacher and Malone 2003). Such an approach could take into account the various kinds of leadership, and correspondingly different personality traits, involved in these separate roles. If new roles of this sort, or other kinds, were created, it would also be important to find a way to translate these positions into comparable slots in other units in the firm, and in outside firms, so that people who assume those jobs can explain them in ways that are broadly recognizable.

Internal guilds

The new processes put into place inside ISE made the organization a more competitive place and made the existence of that competition more open. Individuals could go after the projects they wanted to work on, but with that opportunity also came the potential that a person could express interest in a project and not be selected as a team member. Similar competition takes place in all organizations, but in other settings this competition is less open and is also mediated by managers, with potential conflicts and disappointments thereby buffered and muffled. Several people in ISE were aware of this dynamic, using metaphors from competitive athletics to describe it. One member of ISE Staff said of the staffing process: "Everyone wants the same eight people. And then some people don't get up to bat" And a first-level manager commented,

> It reminds me of grammar school days, picking teams for dodge ball….Really good people will be constantly in demand…But who's left at the end? Do you let them twiddle their thumbs? You have this today, but you also managers today to find something for them to do."

Individual contributors as well were aware of what was at stake for them personally in project staffing and sometimes expressed anxiety whether they had enough ability to influence those decisions. One individual contributor said.

> I have no idea what kind of projects are coming up. Which gets to the issue of how do you develop yourself?"

The more competitive, less settled organizational environment left some in ISE feeling disconnected and cast adrift. This experience was especially prevalent among relative newcomers to HP who had laissez faire managers. A less-experienced individual contributor put it plainly:

> My manager is very hands off because most people in our group already know what they're doing. It's good if you're experienced, bad if you're new.

The more recent hires who reported to laissez faire managers had particular difficulty. This phenomenon appeared to be exacerbated by the geographic dispersion of ISE's people. Younger workers at ISE, who were quite comfortable with the technical aspects of remote collaboration, had surprisingly negative opinions about telecommuting. When this issue is considered from the perspective not of technical adeptness, but from the point of view of organizational acculturation, this reaction is no surprise. Veterans with previously established networks can afford to work

remotely. More recent arrivals who aren't securely plugged into the organization crave the hallway conversations and informal meetings that occur when work groups are co-located, and they prefer face-to-face interactions on project teams.

The concerns about the competitiveness and the sense of disconnection some felt at ISE indicates that organizations employing temporary, cross-disciplinary project teams may have a greater need for individual coaching and the creation of safe havens where people can retreat to take a respite. Recognition of this need raises important questions about what kinds of supports people require and how to provide them.

A first level manager who operates as a facilitator or talent manager can go part of the way to offering the support such individuals need. But even a dedicated and skillful manager cannot provide people with a community of peers. One approach considered by the ISE Staff, which could not be implemented prior to the merger, was instituting internal "guilds," to provide community and support. Internal guilds are akin to the support organizations that already exist in industries where project work is common, such as the Screen Actors Guild. New organizations of this sort have also begun to emerge recently to serve free-lancers and e-lancers in volatile sectors where attachment to firms has become attenuated (Laubacher and Malone 1997; 2000). In firms where project-based work is the norm, employees can be expected to experience the same need for attachment to a long-standing community felt by free-lancers and e-lancers.

ISE's competencies and technical groups under them were intended to play this role to a degree, but they came to be perceived in many instances as traditional organizational units. To avoid this confusion, one possible approach would be to designate a functional or geographic dimension of a project-based organization explicitly as an internal guild, whose purpose is to serve as a quasi-permanent home that provides support and career guidance. Guilds would explicitly *not* be the place in the organization where the work gets done. Several possible organizational axes could potentially serve as the basis for internal guilds. Grouping based on occupational commonalities, such as area of expertise or tenure, are one possibility. And some people at ISE suggested bringing together people who are in the same geographic region, to augment a highly virtual mode of working with face-to-face connections.

These reflections on guilds are speculative. The study at ISE identified a potential need, and while experiments with internal guilds were considered by ISE Staff, they could not be launched prior to the merge. Efforts going on today to serve workers who operate outside the traditional employment contract can suggest possible approaches that could be tried inside firms in coming years. This is an area ripe for future management experimentation and academic research.

Applicability in other settings

ISE was relatively small in scale and, as an R&D group, was not subject to the time pressures that some operational organizations face. Translating certain aspects of ISE's approach to larger or faster-paced settings would likely require alterations in processes and tools. For

example, larger settings may need more structured and standardized skills profiles (HR-XML 2001), new approaches for ascertaining reputations (Dellarocas 2002) and more sophisticated search methods (Klein and Bernstein 2001). And in faster paced-settings, there may not be enough time to allow for extensive direct conversations between project leaders and interested participants. Several alternatives considered in this study's design study phase might be suitable to faster-paced settings, including structured expression of preferences, accompanied by automatic matching algorithms, or rapid escalation of contentious staffing situations to an arbiter.

Another important question is the extent to which an effort like the one undertaken in ISE can be extended from one unit in a large firm to other units in that firm or even to outside firms. ISE collaborated extensively with other units in HP, with people from those units frequently serving as members of ISE project teams. But this was done informally, a matter of "beg-borrow-and-steal." One manager characterized it as a

> random sort of process…you go through the organization and ping people here and there, and you once make connection [it goes]. Though you don't control the resource.

In an attempt to attract non-ISE talent in HP more systematically and effectively, ISE explored expanding its project staffing processes to other HP groups. The focus was on incremental extensions with individual units, focusing on those where there had been a history of collaboration. The idea was to start with concrete projects in areas of interest and build the rules of engagement out of those specific cases, in the hope that general principles might emerge over time. Uncertainties created by the merger prevented these efforts from coming to fruition.

In some professional services organizations, where project-based work has long been the norm, enterprise-wide staffing tools and processes are being implemented (HR-XML 2001). But in large corporate environments, where there is a legacy of geographic, functional or matrixed organizational practices, case-by-case approaches to extending project staffing practices with other internal units, like those pursued at ISE, appear likely to be the most effective.

Conclusion: Temporary assignments, but a place to call home

ISE's objective was to spark creative research; but it also hoped to develop a model that might be broadly applicable across HP. One first-line manager laid out the ultimate questions that the experiments at ISE were addressing:

> How do you get a group inside a large corporation to act like a small entrepreneurial organization? How to do it in a 150,000 person company?"

In response, ISE developed an organization designed to enable flexible, mix-and-match combining of talent. An underlying principle was to grant greater autonomy to the interested parties—project leaders and individual researchers. The goal was to allow these parties find each other and form teams, with the relevant local actors making the decisions as much as was possible. This was accomplished by distributing information widely and providing a clear set of rules to govern interactions.

These interventions created a flexible environment, where people were freer to pursue their interests. But also resulted in a more rough-and-tumble organization, with a greater need for coaching. One manager emphasized the two aspects of the vision:

> You need to have small groups for people to be part of something—you can't do development planning with 100 people. At the same time, you need the flexibility to morph…People will eventually learn it's okay to work that way.

In such a model, people give sequential allegiance to project teams, but also require a group that can serve as their organizational home, a place to which they can belong on an ongoing basis. In implementing this vision, ISE encountered difficulties, including strong remnants of legacy practices. But it achieved considerable successes as well, and took the learning from its experiments into the new HP. One member of the Staff described how he envisioned the experiments undertaken at ISE might influence the larger HP organization in the future:

> I always saw ISE as a blob of ink in a beaker of water. We're eventually going to be able to change the color of the water a little bit.

The combination of self-matching project teams, brought together by internal e-lancing, and guild-like support structures, can result in an organization that is both more robust and more flexible. By providing people with a home base, and then mixing and matching them on project teams, their position on a formal organizational chart is no longer so important. Since everyone has a place that can serve as their home base, "reorganizing" becomes a matter of simply deploying different combinations of people on projects. Rapid changes can thus be put in place without the disruption and upheaval that are a hallmark of "reorganization" in firms with hierarchical structures. As a member of the ISE Staff commented, such a setup can become "an infrastructure that enables continual reconfiguration."

As the ISE experience shows, the transition to an organization that works this way is not easy or straightforward. But the model represents an interesting alternative for large corporations that seek the flexibility and innovativeness that come with project-based teaming.

Endnotes

[1] The ISE Staff was aware of the potential for variations in the operating practices of the technology groups. The review undertaken by the Staff in the May 2001 to assess the impact of the VC Cafe noted that ISE could operate under three possible models. The first was "All for One," where project work and the required talent would be housed within the same technical group. This model was roughly equivalent to the internally-focused practices of the mini-labs. The second model was "Focus-on-One," where project work would be initiated in a technical group, and most of the talent for the team would be taken from the same group, but with some team members also brought in from outside groups. This roughly corresponded with the lead operator model. The last model laid out in the report was "One-for-All," in which project content would cross technical realms and talent would be drawn from multiple groups. This

corresponded in principle to the talent pool mode and with the actual practice of the hybrid groups when they contributed people to cross-disciplinary projects. In addition to laying out these alternative models, the report also speculated on whether ISE had to operate according to only one of the models or whether the different models could co-exist.

[2] Sociologists use the term strong ties to describe the links between members of a tightly-knit group; weak ties, the looser bonds between people who are acquainted but not close (as with the pair of first-line managers in Figure 5), can serve as bridges between tightly knit groups (Granovetter 1973). The absence of a linkage between tightly-knit groups is termed a structural holes (Burt 1992). Using this terminology, practices patterned after e-lancing can create new kinds of weak ties with the capacity to bridge structural holes in organizations.

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