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**A Phenomenological Study of an Emergent National Digital Library, Part II: The
Narratives of Development**

ABSTRACT

Institutional processes associated with technological innovation in the library context and key transformative event, the completion of the National Digital Library Program (NDLP) at the Library of Congress (1995-2000), are discussed in this article and the accompanying Part I. Interviews with seven key participants of the program conducted in 2002 at the Library of Congress (from policy-makers to digital library developers) are interpreted here in terms of loci of control (external/internal) shaping the process of innovation and its institutionalization — the coercive and normative pressures of society, and the professional field of librarianship. The perceptions of individuals are synthesized into a realist narrative in which their voices are still recognizable. Their tales of development show that organizational change driven by external forces and involving individuals who crossed boundaries of organizational fields can be very successful in forcing organizational isomorphism and integration of digitization in the library processes. The accompanying article, Part I presents theories of social change and organizational rationality, and the social construction of technology (SCOT) and the methodological framework for this phenomenological study.

The digital program of the Library of Congress— officially, the National Digital Library Program, or, NDLP, lasting from 1995 to 2000— is the research site for this case study of an emergent national digital library program. The accompanying article, Part I, presents the theoretical framework, methods of data collection, and summary of major findings. The empirical process of an interpretive phenomenological framework based on the innovators' perspectives about this formative event is presented here. In other words, this is the “telling of the story” itself.

The data collection process used a combination of document analysis and semi-structured interviews with individuals involved with the NDL project at its various stages. The documentary evidence including internally produced technical reports and published reports in professional literature, the evaluation and usability studies and the external expert reports prepared at different stages of the project aided in establishing the baseline chronology presented in the accompanying article Part I. These documents reflect best practices and an official view of the process. Some of the informants were also producers of this extensive documentation. The perspective of the participants and their definitions and understanding of technology innovation provides an interpretive framework for the process. Interviews provided an insight into the organizational process from an experiential point of view though, as argued here, that point of observation is not entirely subjective. It is determined by these individuals' role as innovators.

The interviews were conducted over two days at the Library of Congress, on July 15-16, 2002, with the former NDLP staff who was involved with the project for two years or longer. At the time of the interviews, the pilot stage of the NDLP (1995-2000) was completed and some of the interviewees were assigned either to duties in other parts of

the library, were finishing the projects that were part of the NDLP, or were involved with post-NDLP restructuring programs.

The study participants were recruited through an email posted on an internal listserv by a library administrator who also volunteered for the study. Another informant and a former member of the American Memory project staff helped recruit key individuals who were involved with the NDLP, in addition to those who self-identified through a call for volunteers. The second individual who helped recruit informants considered the resultant study group to be representative of key project personnel and social groups involved with the NDLP. All but one of the participants was female; most of them were aged 30-50 and were at different stages of their career; minorities were not represented in this group. All of these individuals were associated with a range of activities for the duration of the NDLP. All of the participants were currently employed at the Library of Congress although not all of them continue to be involved with the library's digital programs. Two of them have not been among the core staff for the duration of the project, but were significantly involved with the project in policy-related activities. At the time of the interview, one of them was involved with post-NDLP restructuring and integration of the digital conversion activities and the utilization of the resources of the NDLP. This study does not include all of the original staff of the NDLP, some of whom have since left the Library.² The interviewees' responses are aggregated in the analysis. Because of the focus on individual perception, quotes from the interviews are coded (P1-P7).

² For example, one of the key figures has since retired and was not available at the time of the interviews. In the project documentation, the names of other key personnel appear who have since left the library. For example, Suzanne Thorin, the Chief of Staff and

[INSERT TABLE 1 HERE]

As shown in Table 1, the majority of the informants were involved with the NDLP for most of the duration of the project. The type of their involvement with the NDLP varied in responsibility level and scope. They also shifted their responsibilities over time. Among them were digital projects team managers, coordinators, and administrators. Their institutional roles included core, educational services, and infrastructure staff.

Data collection was conducted through semi-structured interviews organized around 14 open-ended questions. The questions touched on a variety of themes, including the informants' involvement with the digital library development, the history of the initiative at the Library of Congress, their experience with specific projects, and their awareness of collection development policies and of the novel uses of collections. The description of the study, and the interview guide were (e)mailed to the participants prior to the interview. Some of the participants prepared notes, which they used as memory aids during the interview. The actual interviews lasted from 60 to 90 minutes and were taped. (The interview guide is reproduced in the Appendix. Questions 7-9 are not used in the analysis because the responses dealt with specifics of collection development and their uses.)

ANALYSIS

The findings demonstrate the informants' perception of the process as a digital library emerged, its development stages and its effects on the institutional context. From the initiation to the stabilization of the new technological frame for access to the Library's

Coordinator of the NDLP, and Laura Campbell, Director of the National Digital Library Program, are no longer with the project which has recruited original participants.

collections, the analysis is presented in terms of four perspectives corresponding to the research objectives identified in [Table 2](#). They include the narratives of identity (1); focus on key events in the history of the project as the participants of the study reflected on the process of emergence of a digital library and their perception of closure (2); and as they reflected on other groups that were involved in the process of development and definition of the digital library program (3), and the negotiation processes involved in the development work (4).

[INSERT TABLE 2 HERE]

The theoretical framework discussed in the accompanying article Part I in this issue is condensed in two tables of definition of key terms: the terms related to the Social Construction of Technology (SCOT) framework [1, 2] in [Table 3](#) and the organizational rationality framework [3] in [Table 4](#).

[INSERT TABLE 3 HERE]

[INSERT TABLE 4 HERE]

(1) **The Institutional Roles and Self-Perception** (Responses to questions 1, 2)

In the interviews, the participants were asked to self-identify in terms of their roles in the NDLP, affiliation with specific projects, length of involvement with the NDLP, and current position at the Library of Congress. The assumption was that their roles (in the organization or related to activities at the NDLP) have an impact on how actors (operants) are discursively engaged in the interpretation of technological development (*technological frames* in SCOT framework [1]). The assessment of roles is based on the informants' statements about their position in the organization; the literature on digital library development was used to further categorize these roles. Analyst-assigned roles

stated the length of involvement with the NDLP, as well as the organizational roles, domain-specific roles, and the participants' roles in relation to knowledge life cycle. The informant-defined roles, and analyst-defined roles are presented in Table 1. In addition to this characterization, the participants' "career narratives" offer an insight into how the informants identify themselves in terms of networks of practice and social groupings in the organizational context. According to SCOT framework, "the actors themselves give clues as to which groups are relevant" and "following the actor" is necessary to split the relevant social group into different subgroups [2, pp. 363-364].

Career Path Narratives

Some of the participants framed their career histories in terms of digital (technology) movement; some related their career paths to corresponding changes in the media environment, to the history of technological innovation, and to implications of these changes in the library setting.

(My history of involvement goes back even before I worked at the Library of Congress.) ... In a way my interest in digital content and the shaping and dissemination of digital content, as well as the archiving of digital content, is reasonably well connected to my work in television and other media before I came to the library. And [in] every case, the underlying issue has to do with culture, or cultural documentation, and the use of technology in association with that cultural documentation, for distillation or reportage, what have you. ... The library became involved with electronic media in a noticeable way, in a significant way, in the 1980s, and I think I am probably one of the few people who work here that was involved in projects of 20 years ago. (P1)

The time-frame thus established allowed the informants to emphasize how media / technology shaped them for their role in the development of the digital collection at the Library of Congress; how exposure to technological innovation in the culture-information sector ("cultural documentation" in the words of this informant) made them adaptable to deal with the emerging technologies. Two of the informants came to the NDLP from a

publishing background. In these different accounts of career development, the focus on an individual's path in adopting technologies is prominent.

I originally came at this from a publishing background. I worked in another cultural heritage institution in Washington, a large one; and I was in publishing [?] in one of those organizations ... as the development of the Internet began affecting our publishing initiatives, I took on a role in several initiatives. (P4)

There is ambiguity about identity and career beginnings in these narratives, when they combine self-directedness in career development with themes of incidental or almost involuntary shifting into the roles related to emergent technologies and technology-related functions at the Library of Congress.

(During this time period) ... I answered a call for volunteers to work in the Learning Center downstairs, to demo for people and to answer reference questions that came into AM. ... So, that's what I did during that volunteer detail for three months. And then I went back to my old job and then I came back to the Learning Center on a second detail and then I stayed because they created a job, a new job. (P6)

Ambiguity is related to difficulties in mapping the emerging roles with established job functions within the library, or the professional identity of librarianship. Several subjects explicitly referred to their outsider status with regard to librarianship, but also with regard to IT professionals (individuals who develop technologies for the DL but are distinct from librarians). Distinct from the group whom they call technologists, they also use language that identifies them as outsiders to the library world.

Our frequent phrase, how we describe ourselves, is technical humanists; and that is pretty descriptive because we have a lot of humanities individuals with technical aspects to their career paths, rather than formal training in technical areas. That's one of the things that makes the DL program mesh well in the library environment is the humanities with the technical bent and it means less culture clash in some cases. (P4)

And I am not a librarian. I have a degree in linguistics and humanities background. (P4)

I got into the field in terms of a publishing background. Though not a librarian ... [adds] and a lot of the staff in the digital library came with a more varied background: we had scientists, we had historians, we had musicians, a lot of

different types of people involved rather than technical people or the librarians creating the collections. (P3)

As they attempt to formulate a statement of career identity (who they are) in terms of the community of practice that emerged with the NDLP, the participants use anomalous categories, such as “technical humanists,” or refer to a process through which they moved from one professional community to another, project-specific and difficult to define in terms of standard categories. The new identity is grounded though not locked into the IT or librarian position.

My background is in computing, I have done computing in libraries for quite a lot of my career before coming to the Library of Congress. (P7)

And the fit becomes the focus rather than the distinction.

Now I am also a librarian [in addition to being an attorney]. (P5)

Their mediating role as interpreters of the emerging technologies in the library setting is another important focus.

I have served that bridging role in the building of AM as being a technical person who is familiar enough with libraries to understand how things work. So my involvement with the Initiative has been as a generalist on the architecture infrastructure side. By generalist I mean as sort of analyst and architecture planner, rather than a programmer. (P7)

So I spend a lot of my time interpreting for my different groups of colleagues, explaining to the attorneys what the librarians want and trying to explain to the librarians why or how the law is circumscribed in what they want to do. Now my involvement with digital library at the institution is really twofold [‘to interpret liability risks’ for digitalized collections]. (P5)

As one of the participants explains in identifying her current role in the library, a mediator retains an outsider status that allows for her distancing and maintaining of an insider-outsider status.

What I am doing now is the management of a different sort of project, but it’s digitally related. So, helping librarians use the collections or use their own services within their own library networking environment and providing resources collaboratively to help answer patron’s questions when they come to

the websites, the digital libraries. So it is all integrated. I'm at the other end now. I was creating, now I'm helping with the access. (P3)

Because some of the DL staff came to the project from other fields or application domains, they were free from shared history (organizational constraint). Thus, their risk in adopting change is lesser. Their loyalties were project-based and they depended on soft money. Because of the heterogeneity of that group, identity could not be established through the competencies they brought into the field. Instead, the blend of backgrounds and certain competencies that were different provided for them a chance of becoming innovators and it is that status that provided a strong focus for identity. It is this previous experience that provided the opportunity to have access to this new field in which they felt outsiders.

The individual decision-makers and structure shape the process of technological transformation. Structure acts on three levels: society (external to the organization), professional norms (external and internal), and as organizational pressures for efficiency and control (internal to the organization). Based on career statements and self-perceptions of roles in relation to technological development, it was possible to visualize how each of the participants fit within the structural field of society, profession and organization shown as overlapping gravity fields within which participants develop their technological frames of innovation and allegiances to a course of action (see Figure 1).

[INSERT FIGURE 1 HERE]

As shown in Figure 1, the participants are not only influenced by society and librarianship; the dominant influence for all participants is the organization. They are all acted upon by organizational processes while are driven more by society concerns. For example, two individuals (P3 and P4) see themselves as introducing innovative

knowledge into the organization (and only by default to the profession). Other two individuals (P2 and P6) see their roles in the context of mutually dependent professional requirements and organizational process. Three of them (P1 and P7) see their innovation roles in relation to all three forces (society, organization and profession) although (P5) self-identifies as a mediator of the organizational and professional perspectives on innovation (as related to intellectual property work) with society. (This participant has not been among the core staff of the NDLP). P1 offers a most integrated view of structural forces as they act upon technological innovation.

The interviewees reflect on the anomalous and ambiguous relationship both to librarianship and the technical staff (no doubt referring to the systems group or what the 1995 planning document [4] refers to as infrastructure staff; or the technology-domain staff in another systematization of roles [5]). That these innovators are an outsider group (technical humanists in the words of one of the interviewees) confirms Paul DiMaggio's hypothesis that innovators are outsiders to the organizational field [3]. Because they do not exhibit an emerging professional identity either, their role ambiguity is not resolved at the completion of the NDLP.

The interesting question is rather what makes them fit into the digital library field? Are they insiders as well? As already stated, their credibility and competencies that brought them on board the NDLP is established in reference to external developments, namely participation in the digital movement (two of them through involvement with electronic publishing and one in terms of the historical media shifts as an early adopter of technology). Some of them referred to this accidental connection to librarianship repeatedly. Thus, the interviewees invoked external loci of control (i.e., technology

shifts) in explaining their career path (coercive isomorphism) [3]. Their emphasis on being an early adopter of technology, while having outsider status with regard to a technologist or librarian group, shows that the explanation of roles is in terms of cultural pressures of society at large rather than normative pressures [3] from within the organizational field (i.e., reasoning that is based on the tenets of librarianship as a field of practice). As already stated, they do not build their identities in terms of an emerging community of practice of digital librarianship either (normative pressures [3]). In terms of the categories provided by the theoretical framework, the locus of control at this point is not the normative pressure of an emerging professional identity but mimetic isomorphism, or maintenance of organizational processes initiated by the DL development, spreading “the love of the digital” integrated with discourse about the provision of access to information. The insider status was based on their role as interpreters and on an awareness of normative pressures that provided the locus of control for other social groups.

The emerging technological frame for the digital library system (the NDLP) for these protagonists is constructed around the process of communication and mediation in which non-technical groups have a central role. The innovators are included in more than one technological frame simultaneously. They are aware of the technological frames of the relevant social groups upon which they depend for the definition of goals (non-technical groups such as politicians, administrators, users) or the provision of tools needed to solve problems (systems and technology staff, and the librarians, notably curatorial staff who provide access to the collections). They explicitly refer to themselves as non-members in those groups although their degree of inclusion in these groups’ technological frames is

high, thus confirming the hypothesis that innovation often comes from inclusion in more than one technological frame; it also contradicts the statement that each relevant social group has its own technological frame and thus converges in power blocs [1].

(2) Formative Events and Project Landmarks (Responses to questions 3, 4)

The year 1995 is taken as a beginning date of a cycle of development that ends with 2000, thus establishing an objective time frame based on the NDLP documentation and the official duration of the project. For the protagonists, the primary time frame is not chronological but is organized around the cycles of development of the technological invention. The cycle of development is a time-bound process defined by landmark transitions. These landmarks are points at which redefinition of the problem occurs. This, as already stated, is part of the semantic stabilization and closure mechanism and corresponds to SCOT framework.

Most of the interviewed participants referred to the development of the DL system in relation to an objective goal of 5 million images in 5 years. Closure (“agency”) is thus determined externally. The 5-year process thus identified corresponds to a standard empiricist view of the process of closure that can be limited to specific dates [2, p. 366]. This headline of “5 million images in 5 years” is designed as a symbolic resource needed for semiotic processing of the meaning of a technological invention, providing a common symbol for the developers, society, politicians, donors, and administrators. Attaching a headline is a necessary step for building “teleological history” around an invention, thus allowing for the meaning of artifacts to be elaborated and adjusted within a common (symbolic) framework. It is at the same time an imposed meaning, which does not offer an insight into an actual process. While the slogan serves to reduce interpretative

flexibility as the first step of semiotic stabilization, the fixity of meaning is a dynamic process. The development in terms of significant steps that preceded and followed the NDLP is synthesized from the interviews and interrelated with SCOT framework in Figure 2.

[INSERT FIGURE 2 HERE]

Cornerstone Closure, Reframing the Questions

Applying a bureaucratic mechanism to defining technologies (here, the quantity tied to the production aspects of building the digital library system), aids establishment of routines, thus diminishing controversies around meaning as different groups are brought on board. Definition of closure has semiotic power [1] as it enables establishing actions (routines). The completion of the institutionalization process in the organization itself is obviously more complex than closure identified by reaching the goal of 5 million digital items in 5 years and will be discussed subsequently.

Nevertheless, the teleological closure incorporated in the phrase, “5 million items in 5 years” had a definite impact for the project staff. With the exception of two participants (P1 and P7, who are also the senior staff on the project), this phrase emerges as a leitmotif in a number of contexts. It is used as a marker of the beginning and the end of the project, and as measure of its success. Transformation is one way to measure a large or small difference and the dimensions taken here were closure-effective, quantifiable, and specific.

The mandate by Congress in 1995 [was] to develop the digital information or the NDL program. [We] initiated a number of activities here at the library where we created a fairly sizable program to enable the development of these 5 million digital objects in 5 years, it was a fairly hefty goal and the goal was met in the year 2000. (P4)

I guess the major development would be when ... Congress got 5 million dollars to start the digitizing process or to put the online collections up. And that was

post-Optical Disk, the Optical Disk Pilot project ... I think they got the initial money and [in] 1995 they began the 5-year-process which ended in 2000. And I think that was probably a very big ... it was a key stage. (P6)

The headline “5 million digital objects in 5 years” is used in reference to the legitimacy of the established routines by which the DL staff could communicate their roles and purpose to the rest of the Library staff (mimetic processes). It thus identifies the activities of the project staff in relation to more mediated groups which had less access to the development of the DL technology (curatorial staff, the Congress).

[W]ith the understanding that our primary goal for the digitization program was 5 million digital objects in 5 years. So for example, in that time frame many of the collections that were digitized from large collections were essentially as easy to do 10,000 of them as it was to do 1,000 of them. You just you know once you have the setup done, you just keep scanning. (P4)

It seemed that 5 million in 5 years was driving a lot of decision making in the first 5 years: you know, ‘are we going to meet our goal?’ Some of the other things that might have happened like making sure that the dpi was at a level that could be truly called preservation or even thinking about preservation and access together, or who would use the collections and why, [became secondary]. [It was as] if you gave a million dollars and you said, but I only want the Marija Dalbello Collection digitized [that would be driving decision making]. That was it. (P2)

The recurring reference to “5 million in 5 years” is an indicator of cornerstone closure (interpretative flexibility) that ends a stage of development and results in reframing the question. It is interesting that the phrase reinforces the external locus of control for the project (coercive isomorphism [3]). With this closure point, the end is defined as process, another transition.

You know they [NDLP] were a special project, they did what they were supposed to do, end of story, move on to something else. It’s now the task of the reference staff to say ok I see we have online collections, we have print collections, we have other media collections, how do all these integrate. And that’s what’s happening now. (P2)

The reasons that it [became] integrated? Well, it [became] integrated because the project had its goal, and because the project had its goal and we met the goal. (P3)

[This] activity is very much in transition in terms of moving from a pilot project which was a NDL project which had a goal of 5 million items in 5 years and that

goal largely determined, largely determined some of the activities and the decisions that were made in terms of what do we digitize, how do we digitize it and how do we get it online. Now the determination has been made that the project was a success and that we want to have digital conversion of the library's collections be part of the library's overall mission. And as library services, four goals are: to acquire, preserve, describe, and serve, the digital conversion process is being integrated into the activities of the custodial divisions so that it is part of the service of the library to make materials available online. (P4)

After we met our goals we started to cut back and the staffing is spread out a little bit more so that the number of people working on these collections has decreased. And, smaller collections are being proposed. The huge [collections], I think a good example is the Law Library [collection], would scan thousands of images a week to try to meet our goal. It would just crank out images [laughs]. And they're fabulous resources online. But those kinds of large-scale projects are not being proposed as much because we don't have the big goals of ... to please Congress, of needing 5 million items any more. So we're looking at smaller collections, more focused ... 'boutique' collections that are more subject related ... But it seems like things are shifting so people can spend little bit more time developing useful collections rather than putting up, you know, hundreds of thousands of items. And I think there's value in both. Though we don't have the resources any more to do the huge collections [laughs] (P3)

At the end of the five-year-period, new relevant social groups become involved, and new elaboration of meaning of artifact takes place.

What's new and different that we can bring to light through digital technology? ... and so I think we're still struggling with that. I mean it's easy, you set the scanner up and you go [shuffles paper to demonstrate activity of routine scanning], you know item 1 through 50,000. I don't need to think about it, I've just scanned it. I've used the digital technology like photocopier. And I throw a little text in there, and I throw a bibliography together and I call it a day. And I'm saying that ... I think that we needed to do more and there needed to be more involvement with finding out what researchers wanted and talking with the reference staff and the specialists about the stories that they thought were worth telling. So I think that's to me an important thing that we can do now that we couldn't do easily then. Because you know it was a production, you know, the train left the station; it was on its way to do 5 million images, you know, don't bug me with stuff that I don't need to think about. (P2)

Here, the reorganization process at the end of the five-year period during which the massive production was stopped and project teams disbanded, also called for a redefinition of the problem from preservation to access — reframing the problem [6, pp. 353-354]. This demonstrates how technological frames can specify actions of relevant social groups but they are also constraining factors at the same time as they serve to enable certain developments. The shift to more focused, subject-based “boutique”

collections is an implication that some of the staff recognized as part of that reframing, although archival vs. “boutique” collections models for future collection development have not been resolved at the time of this study. There were indications that a technological shift that would be politically supported would be the preferred resolution.

The integration of the conversion process into regular library operations (the activities of the custodial divisions), as one of the interviewees notes, is another important aspect in reframing meaning in the design stage of technology. While the DL development team started the process without knowing how it would be integrated, the process was guided by what would be wanted or politically supported.

So while we don't do preservation scanning here at the library necessarily, this one time they knew [curatorial staff] that the digital items will be served first and that if the researcher would want to see the collection, they would be allowed access to it. They knew it would be an access point for researchers. So I think they came into it knowing what they wanted out of it and were excited for the process for this particular one. But I think in terms of the 5 year, they were kind of at the end of the acceptance of digital things. (P3)

Well, that's part of a longer process that was called the Digital Futures Initiative, which began in the fall of 1999. And we worked on that through 2000 and 2001, with the idea being that the 5-year, 5 million images of the National Digital Library would end. It would cease to exist, and the rest of the library would pick up digital conversion, whatever else the National Digital Library was doing. ... Reference staff didn't evaluate the collections. The staff over here just put them up. They would work with the curators in the Division but there was very little in terms of making linkages with reference and research. It was presented but it was sort of a flat, one-way presentation, not two-way. (P2)

You know, they were a special project, they did what they were supposed to do, end of story, move on to something else. It's now the task of the reference staff to say ok I see we have online collections, we have print collections, we have other media collections, how do all these integrate. And that's what's happening now. (P2)

There seems to be another narrative of technology and shifts in the meaning of technology that one of the informants refers to as she remembers the pilot project preceding the NDLP.

You know that in 1990 we started a pilot project for AM and for 5 years it was a pilot and I literally remember that people who were doing it [gives two names] trundling around a cart throughout a library. It was the AM show ... Most

people in the library had a chuckle about it. They, you know, had CD burners and all that kind of fancy stuff and a huge conglomeration of equipment. (P5)

With all digital projects the technology and the content you know go hand in hand and [it] depends which hat the people are wearing or they want to talk about. But at the time we were most fascinated with technology. Or it seemed that way. That AM demo phase went on for 5 years or so. And then we got a mandate from Congress to get serious about this and we began to move AM to the web. (P5)

The sheer fascination of technology as defining the DL system in the initial stage is seen here through the eyes of an ironic (though sympathetic) beholder, and may be representative of the technological frame for the library staff and those who were not involved with the NDLP from the outset. The view expressed here is one in which “technology” is defined in the sense of “computers” (hardware). As another participant notes, it is the symbolic nature of technology rather than utilitarian frame through which it is originally perceived.

One of the most striking things that affects reformatting is the problem of the physical handling of the original items ... and I'm now really thinking of American Memory pilot period experiences. Our visitors thought of it as a technology project. They would look at the computer screen, they would look at the CD, and you know their minds would be full of the shiny disks we would use or how the thing came up on the computer screen, or how a movie could be in the computer, whatever it is. And so you found yourself talking to people about technology, and when they talked about technology you had an expectation that there would be high efficiency, costs would drop over time, you know this was an area in which all of these modern technologies could be applied. But what that failed to recognize, and what we tried to talk about, was the challenge and the labor intensity of the conversion of things in initial form. (P1)

The integration of the DL system at the end of the process in 2002 emerges as central in the organizational and individual interpretations.

Key Stages of Development: Subjective Histories

In reflecting on the stages of development and defining the beginning and the end of the process, informants share a grand narrative of development and common history, even when they came into the development later. Their stories of development reveal the

technological frame from which they see the digital library system. Even though they remember similar events, they give different meanings to them. One of the informants (P1) frames development in terms of the progress of technologies and consequent administrative responses. Accordingly, the explanation focuses on professional commitment to “disseminated access” that began with a series of technological shifts starting with microfilm technology in the 1930s; and continuing with standardization of digital cataloging in the 1960s. Digital reformatting in the 1980s shapes the present paradigm.

So there is a sense in which these electronic approaches, digital approaches, are for me an expression of, you know, a one or two hundred year long impulse to provide access to things and help people find what they need to answer their own questions. (P1)

In all of these cases, the informant chooses loci of control outside the library institution, focusing on the evolution of technologies (coercive isomorphism) and librarianship (normative pressures) rather than institutional context (mimetic processes). The informant also refers to the project phases as “structured phases” imposed administratively to articulate the evolution of technologies and their effect in the library setting. This informant sees technologies as supporting the memory function of the library in contrast to use (access); DL development is accordingly extending the archival (preservation) function in support of scholarship.

Referring to the Optical Disk Project (1982-1987) and American Memory (1995-2000) as distinct yet falling within the same paradigm, this informant recognizes a semantic shift from a technology-centric to a content-centric approach when he contrasts these two projects.

I will point out a striking feature of the names of the two projects, which I’ve thought about a lot. The Optical Disk Pilot project has in its name ‘Optical

Disk,' the name of the technology, and it was technologically oriented, and it had to do in large part with technology problem solving, although partly with content. American Memory does not have any technology in its name. It's the name of a vague and amorphous body of content. And so by the name alone, American Memory I think is rather more content-centric and the Optical Disk Project had been rather more technology-centric. (P1)

The issue of reformatting (through creating a mirror representation of an information object) vs. archiving digitally born documents remains at the root of collection development ambiguity in the area of digital collections. Given that this informant defines the technological frame for the digital library development in terms of external loci (technological shifts), framed within the ideology of universal access, the logical extension is this idealized view of the DL. The technology antecedent is not the only framework for reasoning for this individual, although the institution (Library of Congress) is seen to respond to technology push and economic determinism.

And this goes back to the question actually, you asked me, or I asked you at the beginning about reformatting versus born digital. It is absolutely the case of, that evolution has brought us to the point where we do have a much higher interest in the new literature and the new documents that are in digital form, so that gets added into this evolutionary mix. And we have a much stronger feeling about the need to preserve content in digital form. No surprise AM and the NDLP had a cost of at least 60 million dollars, maybe 70 or 80 million dollars if you count a lot of the corollary things. That's an asset, that we have, that costs that much money, it's a very high-value asset, you don't want to lose it. So the preservation of that asset becomes important just as preservation of newly created content. So I think again, the phase, the structured phase we're all in at this point, it begins to concern itself more and more with these questions. And that seems orderly enough. You know, the evolution has brought us to that point. (P1)

Technological determinist stance has been associated with communication theorists including Harold Innis, Siegfried Giedeon, and Marshall McLuhan. It has been influential in futurist and modernist concepts of technology and media. Although this informant insists on the evolutionary rather than revolutionary aspects of information technologies, legitimate only in terms of universal access (and the ethos of librarianship to provide

disseminated access), the basic paradigm by which the stages are defined is technocentric.

Technological frames that emphasize purposeful change represent the alternative view. Such views focus on human arrangements and institutions. In one informant's view (who was involved in post-NDLP planning but wasn't among the core staff for the duration of the project and thus has less interest in maintaining the idealized view with which the project was launched and more investment in the process of change), the key points revolved around interpretive aspects of the collections, the educators institutes, the learning pages, and integration with the broader social context. This frame provides a definition from the utilization point of view.

I mean, as far as I'm concerned, they had a 1994/95 launch, they raised the money, in 2000/2001 we had 5 million images, you know, 'have a nice life.' ... From an outsider's perspective, probably creating 1 million pages, and the Visitors' Center, I mean, and having those kinds of initiatives built into interpreting what we were doing and giving training to other people. ... Another key initiative would have been the Ameritech Competition, which I think was 1998. And that's where, you know, panel of experts would select collections, and that would become part of our 5 million which was what we promised the Congress we would do, '5 years 5 million objects.' (P2)

The determinants of key stages by other informants (most of whom were involved with the production) are in terms of integration of change and institutional transformation.

A certain uncertainty regarding preservation and utilization-focus emerges from these narratives. Together, these views represent the social-context view, with its focus on human agency, social controls, and power. Several informants pointed to shifts in institutional culture as significant turning points. In one such account, one of them (P7) reflects on different stages without providing an exact chronology but identifying subjectively as a turning point the time before and after the Ameritech competition

(“Ameritech competition came fairly soon after that”) in 1998-1999, when significant resources started to be devoted to the NDLP.

So, I mean that was clearly an important stage, when the digital library initiative went from being three or four people who worked very closely to involving a staff of I think we’ve got close to a hundred. (P7)

In 2002 when these interviews were done, the institution was still undergoing transformation and restructuring of its digital programs. In the interviews, the informants referred to that aspect as a key stage.

The most recent phase is another stage, which is trying to mainstream all the activities, and you understand that it’s a sort of transitional stage at the moment, and it’s not clear how everything will end up, organizationally. I think sort of there was a stage at which suddenly the rest of the library realized ‘this is really going to happen, and it’s going to continue’ and began to want a piece of it, whereas initially they were happy for it to be a separate program. I think it happened gradually, and I think in a couple of divisions, they realized that they had something to gain from what was going on, and got involved heavily and early on, and that’s the Prints & Photographs Division, and the Geography and Maps Division. I think that probably the realization that it was significant came rather later to the people who served the traditional reference roles. And that was to do with more stuff being online anyway, and beginning to realize that digitization and building digital collections didn’t just need to be things focused on education, you could see the process of digitization as providing better access for different sorts of purposes. (P7)

That stage (dated by the informant in 1998-1999) is one at which support for the DL development and a realization of its potential across the institution (and especially among reference staff primarily involved with access) emerged. At that point, a reframing of the technological artifact occurred and new relevant social groups became more actively involved in defining the technological frame for the DL.

Another informant referred to changes in the organizational culture as the project proceeded, toward an understanding of digitalization in supporting conservation and preservation of collections while enabling access.

Selection process relied on curators in the collections to be able to make good suggestions about what would be a good collection to put up and there was some concern about participating in this process. And especially when it came to collections that were fragile, brittle, or valuable ... that this conversion process

would make the items, you know, if they had to be sent for conversion that they would not be accessible, perhaps that the items would be damaged in some ways, things like that. That was a long time ago though. I think that's gone now, I really do. (P6)

Another informant refers to integrative processes among the different parts of the library as an outcome of project completion. She sees organizational change in the light of that outcome and her own continuing role in this process without an actual closure.

And I think in the years that we took to develop the program also there was a change in the view around the library about these types of things [digitalization]. And it was more it was forced to become more integrated at the end of the project and I think it's worked well because the staff has spread out into different like ... I myself have gone to a different area but I am still working with similar people, working to spread that love of the digital into other areas. So I think it worked out pretty well with the staff you know dispersing into other parts of the library at this point. (P3)

The definition of key stages by this informant uses the language of goal-driven and project-defined production. She considers the pilot an experiment aimed at "introducing this type of work into the library community, changes not always very well received, as we know" (P3). This participant reflects on the change in the culture that emerged at the end of the process and the integration of the digitization process across the institution (mimetic processes in the organization). This represents a shift away from large-scale production: "we don't have the big goals to please Congress, of needing 5 million items any more" (P3).

Another interviewee refers to the LC 21 report [7], an evaluation of the NDLP by outside experts in 2000, as a key stage. The report was disseminated among DL researchers and practitioners. Its immediate result in the institution was as an institutionally sanctioned closure.

So, as a key stage of the digital library development that report was taken into consideration for some of the future decisions that were made. ... it was somewhat, it was determined, some of it was relevant to how the library works

and some of it was sort of, oh well, it's a nice idea. But it did allow us to move forward. Some of the initiatives, I think, that might not have otherwise had ... it raised the priority level of some of the activities that were going on. ... It gave more people more reason to participate and to move forward the initiatives that may have been a lower priority previously. (P4)

Rather than offering a personal assessment, this participant uses an official document as a point of reference, thus defining the key stage (of cornerstone closure) in formal terms, a top-down, process-related aspect of institutionalization, rather than from a practice-driven, subjective point of view that is found in the statements of the informants quoted earlier. This approach was in agreement with this informant's overall performance in the interview: providing an objective, detailed, and distanced overview of the history of digital initiatives at the Library of Congress from a process point of view. Again, the focus is on integration within the organization, and the central role (agency) of the DL system; but integrative processes are defined even more broadly, encompassing other institutions and a broader context. The informant recognizes as a key stage a shift in the institutional mission and infrastructural development that affected constituencies outside the Library of Congress. The NDLP is seen as a test-bed for an overall infrastructure that the NDIIPP as the emerging initiative in 2002 needs to address, with a goal that exceeds the organizational boundary. In that model, the Library of Congress assumes agency for coercive isomorphism; its best practices become relevant for society at large.

Before the thinking behind it ended, the NDLP really existed mostly with inside the LC as well including these other institutions, these Ameritech institutions. But in fact, it's simply only one component of the types of digital resources that need to be preserved by an overall infrastructure. And it's a good example, because it has 8 million digital objects and it is pretty big and broad and we know it well so it makes sense for us as a test-bed of these various types of ideas and protocols and things like that. (P4)

Institutionally defined events—such as the establishment of formal initiatives, task forces, or completion of official reports—are referred to by other informants as key

stages. This demonstrates the importance of politically sanctioned and legitimated institutional rituals. For example, the establishment of the Office of Strategic Initiatives (in 2001) is seen by one informant as a key stage in the development of the digital initiatives at the Library of Congress.

The publishing industry and the entertainment industry ... are also major stakeholders in the development of an information infrastructure when it comes to digital information. And so, the charge at the moment is to come up with a plan and a plan that has the consensus of many of these you know, there had been many, many at this point, high level planning sessions or at least investigation areas that ... areas of investigation so that we can attempt to as a cooperation ... we're sort of just facilitators of the plan; and there will be a report to Congress made in September, I believe, on what the initial phases will be. But that's a major role for this Office of Strategic Initiatives because a strategic initiative is not at the Library, it [is] also of the library as service to the nation. (P4)

The development of the Office of Strategic Initiatives was a key stage in the development of the DL initiatives because this is very recent development in the library but at the same time it provides a focal point for some of the initiatives. Well, many of the initiatives of individual parts of the library [is] to either be coordinated or to increase the possibilities of a coordinated effort within a larger organization like us. So that's one of the most recent developments, and as a result of the end of the pilot project it was decided by the library management to integrate the digital conversion program or the digital conversion activity into part of the activities of the library of library services and that's as I previously described it. So, that's where we stand currently. (P4)

Because it represents a new administrative framework for the development of LC's digital resource policies, the NDIIP has been brought up repeatedly by the participants in this study, but not identified as a key stage related to the NDLP.

And now we have a project that is imperfectly named, it's partly the National Digital Information Infrastructure for Preservation Program, whatever the NDIIPP program is (I can't get over all the words in the right order). Which is sort of the parent of, you know, digital reformatting, although with more and more interest in preservation. But it seems to me that again you sort of have this evolution that is much more continuous, and then you have projects that are administrators' way of trying to organize these things. (P1)

Articulating the dispersed institutional processes within the same framework and establishing a broader context for the existing digital initiatives and the "library as service

to the Nation” is an integrative process exceeding the coordination of divisional resources.

From Emergence to Effectuation

As seen in the accounts provided by these informants, the abstract points of key developments are framed in terms of infrastructural integration, as a process from development to effectuation. In other words, the DL initiatives have brought about a qualitative shift in the organizational culture, and in the usability of the collections, with an increase in organizational isomorphism (many units are now on board and the “love of the digital” has spread to many parts of the organization). Moreover, there is a promise of an impact beyond the organizational boundaries.

So currently, there is a great deal of overlap in the actual production process between the two organizations within a library; there’s a great deal of cooperation and we call it a matrix activity because we have many different organizations within the library collaborating for a particular purpose and they each play a supporting role in the activity itself. Because of that, we are in this phase that we call the transition phase and we [will] probably still be in that phase for another 6 months to a year until things sort of even out in terms of an actual production process. (P4)

The technology has become invisible, as one of the participants concludes. When trying to list the various digital initiatives in the post-NDLP phase across the library, she interrupts herself by the following statement:

Everything in the library is digital in one way or the other. So, it is kind of hard to break it down quite so distinctly. (P4)

The series of shifts (key stages) that were recognized by the informants indicate their concern with “the rest of the library” and with integrative difficulties for the activities of a special project within existing processes and routines. The administrative closure in 2000 (with the LC 21 report [7] ensuing a year later) coincides with the shift in attitudes and integration of digital processes within the institution.

The informants recognize technological autonomy as a factor in defining the digital library system, and accept the paradox that the “method of doing something becomes the reason for doing it” [8, p. 91] when they refer to the “5 million images in 5 years” program. Nevertheless, this concept is used within the narratives of key stages as a milestone in a continuous rather than discontinuous process [9, p. 81]. The informants present multi-causal explanations of change, not a mono-causal view of the emergent digital library. Reductionist stories of causal development and empiricist views of innovation are conspicuously absent from these narratives of development. Spreading the gospel of the digital (P3), future seen as “building relationships and trust between the groups” (P7), and evidence of integrative processes well under way in 2002 are important in their perception and reflected in administrative activities. The end point is seen as a point of no return but of a qualitative shift that affected integrative processes (isomorphism) within the library and beyond.

There [was] a bunch of people, there were a number of people who sort of did some crossover stuff. I was one of them. They worked both in old library and new library, trying to bring people and I don't really know if I can say it was one time, though. I guess in a way 1998 sounds like. [In] 1998, 1999 people began to realize that it wasn't going to go away. (P6)

In identifying the formative events and project landmarks, the informants recognized the complexity of integrative processes that affected all three levels of isomorphism. It is important to observe how they perceived their agency in a playing field determined by the organization, the profession, and the society at large.

(3) The organizational field, institutional processes (project and departmental), client relations of related institutions, and the society at large (Responses to questions 5, 6, 10, 14)

From the social construction of technology perspective, various social groups involved in defining the DL system have varying levels of impact and relevance for the emerging technology. These groups may correspond to emergent or existing power blocs; at the least, they are recognized as involved with giving meaning to technological innovation. As shown in Table 5, measures of relevance and mediation can designate varying levels of impact to social actors. Relevance to DL system development refers to the degree of input in shaping digital collections and their delivery. Groups can be more or less relevant and more or less mediated, a relationship represented by the proximity to the DL system (the socially constructed and evaluated technology). Mediation indicates directness of impact in developing the DL system, with a greater or lesser number of intermediaries. (Assignations were derived from informants' statements and therefore reflect their perspective.)

[INSERT TABLE 5 HERE]

When considered in terms of relevance and mediation variables, social groups can be identified and compared in terms of their impact and actual ability to shape the DL system. All but the NDL project staff and the technologists were highly mediated groups in terms of input in the development of the system. The collections were developed with high consideration of the relevance of interest of the American public (but low relevance of individual users), and high relevance of the Librarian of Congress and the divisions and curatorial staff at the LC.

This social dynamic is reflected in different arenas of the organizational field (librarianship), the organization (LC), and client-relations with related institutions and society at large. These arenas correspond to the mechanisms of social change enacted by

the profession, the organization, and society. Overall, normative pressures of librarianship are not emphasized in the process of development. The informants measured their successes largely in terms of cognitive authority provided by the external pressure of society; the cognitive authority of the organizational field of librarianship is downplayed in their statements although they perceive their agency and success in changing organizational culture and the perception of librarians and curatorial staff as an important aspect of cornerstone closure, and thus as organizational processes rather than as professional roles. The emphasis on social agency (commitment to “disseminated access” (P1); creating infrastructure for a national policy (P4), and accountability through utilization (P2) were part of their reasoning, but merely in general terms not as a guiding principle. Their discursive engagement is primarily with transformation of the institution and integration as a critical issue of the process of institutionalization of the DL system. They see society and the organizational field of librarianship as secondary.

Narratives of an emergent professional identity are absent; the innovators maintain a flexible connection to the organizational field of librarianship. In the language of SCOT framework, and according to their self-perception, the NDL project staff have a high *degree of inclusion* in the technological frame of more than one relevant social group and were aware of the technological frames of other groups (i.e., they were influenced by the professional aspects of librarianship with its commitment to access, as well as by the technological frames of politicians and managers). The technological frames of different social groups cannot be determined fully without interviewing each of them and studying them comparatively.

Several questions arose in the interactions of the NDL project staff to more mediated groups in the process of development (questions 5-6, 10, 14). Interactions with the curators (subject specialists), divisions (LC), donors (funders), and technologists are brought up most commonly and these constituencies and their representatives--invoked in the discussion of specific projects--were seen as important in enabling or constraining the outcomes, though not predetermining them. Some of these groups are technical, and others non-technical groups; they all have been perceived by the NDL project staff as interacting around an artifact; the ideas, goals, and resources they brought to the development process were seen as significant. Their agency is considered together with the effect of the DL system.

We were usually working closely with the traditional library staff but in our groups we were not necessarily the traditional library staff. We were not necessarily technical but we had the technical skills to some extent. We had some knowledge of the digital library world, we had not as much subject expertise but that was okay. I never became an expert of [mentions collection by name] but that did not prevent me from digitizing her papers. There were experts that we leaned upon within the divisions or, in my case, at the [mentions institution] and the staff of the divisions were very helpful, curators within the divisions, librarians, archivists. (P3)

Curators (subject specialists) were seen as mediating the interests of individuals and user groups (primarily scholars); they were concerned with the conservation of collections and were the primary initiators for many of the digitization projects through writing grants to present specific collections for digitization. In other cases, curators, through their mild or minimum cooperativeness--that may have resulted from their concerns with the implications of “disseminated access” for the use of the collection, and their desire to protect the physical collections because of a fear of improper handling during digitization— represented a significant power bloc. Interpretive flexibility within the curatorial group varies from proponents of digitization as a solution to the problems

of access and as an alternative conservation method to some that were perceived as seeing digitization as a threat. Prints & Photographs Division, Manuscript Division, and Maps Division are the divisions most notably involved during the pilot phase, and contributed in interactions with the NDL project staff in defining the DL system and best practices. The expectations of scholars and curators (seen as mediating the interests of scholars) emerge as a significant shaping force of digitization but not necessarily the only driving force for digitization.

They knew they would be providing access to their collections and this particular one they wanted to ... The collection was heavily used by the researchers but they wanted to preserve it for the future. So while we don't do preservation scanning here at the library necessarily, this one they knew that the digital items will be served first and that if the researcher would want to see the collection, they would be allowed access to it. They knew it would be an access point for researchers. So I think they came into it knowing what they wanted out of it and were excited for the process for this particular one. But I think in terms of the 5-year, they were kind of at the end of the acceptance of digital things.
(P3)

The interest of the public (users at large; non-scholars) is used in argumentation and justification of the online collections, thereby enabling the development of the DL system.

Donors were seen as self-motivated or representing the interests of their organization, and were another socially relevant group which significantly defined the process of the emergence of the DL system and impacted the prioritization of particular collections. “Funders can shape what you do” (P7) was reverberated by many of the informants, with actual examples given of how that affected specific collections.

Another relevant social group that emerges in the interviews are the librarians who are seen primarily as mediators between the users and the (physical) collections. Librarians were seen as separate from the NDL project staff— who saw themselves as the “conversion folk,” “humanities technologists” (P4), project managers and members.

Librarians are also seen as distinct from the curatorial staff and the technical staff.³ They provide reference and administrative functions (managing collections; policy-making roles). The impact of the DL system on that group is seen as providing buffer zones for access and thus providing support for librarian functions (reference, access).

I would say providing the launching points for better use of those trained resources because by answering some of the minimum questions up-front, you make the interaction with the librarians a more meaningful interaction because you've already provided the easy stuff. And in that scenario it's not really diminishing that role but it is more targeting and focusing the use of the librarians. (P4)

References to technologists and the technical process are absent from the narratives although technology is a major component of a DL system. As one of the informants notes (P7), they become librarian-minded. The “pure” technologists are those who problem-solve during the production process. Their invisibility in these narratives may be due to nature of technical processing, which is perceived as an invisible service, a black box, or because some of it was outsourced (scanning).

They train their own people. They are also trained by our conservators in terms of handling materials; ... each collection is reviewed by the Conservation Office before you go forward with scanning, in case there are special requirements that have to happen. Basically, the production work is pretty similar along the way. It's just working with a lot of different people in pulling the pieces together. (P4)

Digitization of maps was brought up as an example of later development in the NDLP (i.e., in 1995-1996, according to P1) because technology issues were not fully resolved for that process from the beginning. The assessment of collections for

³ The librarian group does not necessarily overlap with the roles of curators (subject specialists) and other experts although it is not necessarily distinct either. The reason for this ambiguity is the unique nature of the Library of Congress and the heterogeneity of its collections and purposes.

digitization by a technical review group since 1999 (or 1998, according to P3), indicates that technologists were a group with high autonomy in shaping the DL system. According to SCOT framework, they would be a less mediated group, but less relevant for the development of the DL system as seen by these individuals.

Overall, the informants acknowledge the effects of the availability of the digital collections in leading to new and surprising uses for these collections. A sense prevailed that the DL system initiated a shift in the Library's relations with the users and of new roles for librarians to have emerged.

And again, that goes back to the previous question about expectations for what the library has online and what it has in print collections, still in other print collections, still used and still valued. We haven't stopped collecting print. We haven't stopped collecting hard media it's just that there's a need to create some online presence because as I said, researchers are at a remove from the library and they want and expect to have materials delivered to their desktops. So it's ... It's a little bit of a chicken and egg thing because you use the technology to make the collections more available and then people as a result want more collections available. (P2)

The interviewees agree that a dramatically increased use of the existing collections and services is shifting the original mission for the Library of Congress, not as yet articulated in its official policies and documentation. The LC is “the Library of Last Resort when it comes to reference” (P6) (this implies the practice according to which the potential users are obliged to exhaust their local resources such as the public library, prior to contacting the Library of Congress). The phrase was used several times by the informants to indicate how that mission is changed now, with more reference queries coming to the Library directly. The Library of Congress has become involved with public education without intermediaries.

Maybe even [in] 1997, I can remember speaking with [gives name], who is Head of Reference at [division name]. She said, ‘Oh we cannot answer these reference questions about these online collections; we can't even see them [the terminals for online access have not been installed in the division]. We don't even know it's there.’ But when the maps started coming out, we had those little

insular divisions that are used to answering questions about their collections and only their collections and they are used to answering them you know when they're ready to. ... And all of a sudden there is an online map collection that tons of people are looking at and they have questions about it. And so you know all these reference questions going to the staff that are not just necessarily prepared or excited about this new technology bringing people to their collections. And so that's the one thing I can say units were affected by the process, the old library being, you know in their eyes you know bombarded by the work of these other people who aren't even librarians. (P6)

Increased expectations from newly relevant social groups of users (K-12 audience, teachers) are now an integral component in defining the emergent system. It is not as yet clear how the social construction of the DL system and its evaluation are affected by this transformation. (An initial involvement of the K-12 constituency was through the “learning pages” that serve as collection filters and links to the curriculum themes.)

I spoke about the gap analysis that we have done previously with the help of the Center for Children and Technology. When they looked what we had in the AM and what would meet the needs of K-12 curricula and they suggested areas that we needed to develop further. I mean that is, if you wanted to take somebody's advice. You don't have to take anybody's advice. But that's one measure of what we were building and how we did or didn't meet the needs of the community. (P2)

As socio-technical system, the NDLP and its collections (AM) provide a field of engagement for the American public and a diversity of users (not only scholars and researchers), not as yet fully comprehended by the developers. The users in general are a highly mediated group.

Other libraries and professional networks are seen as having low relevance; they are highly mediated in the DL system development process. Global access, integral to the medium of the DL, has not been seen as a development priority. The ideology of universal access is an unsustainable myth, according to one of the informants.

Somebody coming from the outside would probably be overwhelmed just by the amount and the variety and the comprehensiveness of the collections. It's a little hard to describe; and one ends up using superlatives like 'extraordinary' 'comprehensive' and 'universal' but what does that really mean? And I think we do a much better job of describing to a national audience what we had and didn't do for an international audience. I think that's a very pronounced weakness.

Some of it is lack of leadership from the area of the library that leads the divisions that serve a more international clientele than I do. But I think it's a noticeable lack. And we have very little in our International Horizons or whatever the heck they are calling it these days. (P2)

In the post-NDLP stage, initiation of cooperative projects with sister institutions has acquired organizational interest but there is also skepticism. This skepticism is an outcome of concerns related to “sustainability” and “systemic decision making” in the area of collection development. An absence of strategic planning in collection development is referred to as “cherry-picking” by one of the informants who also notes that leadership in area studies (now lacking) would be a key ingredient to the success of such endeavors.

Well, this is an interesting [project]... we can do this country and this is an interesting ... and personality dependent and driven rather than based on any mission and priority. I mean you can say that LC serves the world but what does that mean? What's the tangible manifestation of that? And if it's these little boutique-i projects that we're having with the Vatican or Spain those are I think a waste of time. ... Somebody makes a phone call and somebody goes and visits the country and you know, somebody knows the ambassador and that's how it starts. And so it's not sustainable and it's not part of systemic decision making. It happens at a very superficial level and people who make it happen walk away because they don't have to do it. And they say 'oh well, you take care of it because it's your area.' So to me it's been a few years and they just don't seem to get off the ground. (P2)

The “cherry-picking” approach is flawed because it is not institutionalized; the responsibilities are not clearly defined and the innovation (digitization processes) has not been integrated throughout the organization. This individual points to the importance of propelling isomorphism (transformative processes related to digitization) from the periphery (the NDL project) to the center (mainstream activities of the library) and the involvement of new relevant groups (area studies) in participating in defining the processes of digitization and matching them to existing routines. In such a scenario, leadership needs to negotiate meanings and purposes and articulate them with simplicity.

(4) Barriers, Negotiation, Conflict-Resolution (Responses to questions 4, 11-13)

The key activity of the NDLP staff revolved around negotiation processes related to the development of the DL system. Conspicuously absent from these interviews were allusions to conflict; there is little variation among them in that regard. Given the potential for conflict generated through processes of innovation, this is surprising. At the same time, such attitude could be expected from individuals who saw themselves as mediators of organizational change, a function integral to their role in the politics of digitization. It may be argued that the potential to report on conflicting situations was reduced because of the successful accomplishment of the project. The simplicity of the message that defined the project goal and the measure of its success (the motto of “5 million images in 5 years”) itself points to a goal that is not defined in terms of ideology (of professional library work) but in terms of quantifiable productivity. A comparable definition of outcome rooted in principles of professional practice would need to benchmark success in terms of access, collections, or institutional efficiency. This production motto, while disregarding the constraints of professional culture (the normative pressures of the organizational field of librarianship), was able to diminish variability and conflict, helping to solidify social transformation without specifying the particulars in the process of organizational transformation.

The interviewees expressed significant variability in their discussion of the effects of innovation. In the interviews, as they qualified the transformative processes they reflected upon, it was clear that they recognized that digitization was moving from the periphery to the center, although they expressed a pronounced sense of ambiguity about the outcome

of innovation and its effects upon the organization. Identifying crisis points in the history of the project and ensuing negotiation processes pointed to areas of ambiguity.

When asked about the barriers encountered in the course of the project, some of the informants focused on specific processes. For example, speaking about the collection that required 3000-5000 copyright permissions, one of them stated:

It [i.e., the barrier] was obviously copyright. It was overwhelming and amazing how many people we had to contact, and how difficult it was to track people down. ... It's a lot of work. And also providing the access at the other at the multiple sites that proved a little complicated technically but ... And there was a lot of extra work to restrict on an item by item basis which we had to do. So we said this item is available this one is not. This image is available this one is not. And that was a lot of hard work. So the technical issues were difficult but we did it. [Gives example of another collection to compare with the first one] seemed to be a lot of--if I am remembering correctly—a lot of review of the collection before we even started scanning because nobody had looked in these boxes for quite some time. So we had to go through and do a lot of pre-scanning preparation. And sometimes with the collection there's not a whole lot of preparation. You've got a book, you just make sure it is scannable, put a target on it, document of it, identify what it is and it is ready. (P3)

As shown here, technical barriers can be seen as one-dimensional. The solution requires “a lot of hard work” to reach a set objective. Most of the informants, however, referred to barriers that included organizational communication processes (in which they invoked relations between the divisions, the DL staff and the librarians, or the curatorial staff and the DL staff). In such cases resolution themes are connected to negotiation of meanings (of technology, the collections and the collection selection, on what the DL will do for the users and the librarians).

The issues of preservation, emerging reference practices, and control of access to information and collections, represent controversies that originate from professional practice.

One of the major barriers for me--from my perspective, having come from the old library--was that the perception of the old library people was that the resources of the LC (all resources) were being dumped into this online initiative, this electronic library, the grab resource, all of this. And so there was a perception that traditional standard reference practices and cataloging practices

and collection development practices were going by the wayside and that in 20 or 30 years, all of this would be gone. I think there was a very strong perception that the web was like data, or something, [that] it would be gone. (P6)

The barrier between the old and the new can be seen in many arenas that were exogenous to the DL project; shifts in perception “by the old library” and the emerging library perception ultimately reach a resolution point. This is similarly one-dimensional in that it assumes a conversion of the “old library” (a paradigm shift in understanding the new resource). In another example, the conflicting models of retrieval were brought up.

And [his – gives name of a person] argument was that what you want here is, you want a search engine that is good with full text and that makes good use of relevance ranking. Because the diversity of your resource and the inclusion of full text means that the payoff is going to be there if you get relevance ranking and have full text searching. This was somewhat unpopular because librarians were so accustomed to thinking about the OPAC and catalog searching and the use of Boolean operators, and precision searching that a catalog can give you, that it’s really unfamiliar. And I think some people who use American Memory still haven’t taught themselves to exploit relevance ranking by making these free-form searches. It pays you to type in 20 words. But that was interesting. And I think again this is about how you overcome the problem of diversity in the resource, and I think we tried to do what we can to overcome that problem. (P1)

Symbolic uncertainties were similarly recognized as a barrier; and they were seen as multi-dimensional. Notably, in response to the question of collection development, comparison of the traditional and the digital collections brought out what could be seen as controversial themes. In any case, this provided a rich ground for elaborating the meaning of the philosophy of collection development. Differences of opinion among the DL staff emerge in these interviews: co-existing futures in (digital) collection development revolve around “curated web exhibit” and “archival” online collection as two contrasted models. These were as yet unresolved in 2002 even as the project was seen to have a closure and had reached a successful conclusion in 2000.

What is a Digital Collection After all?

The interviews point to a general shift from a DL system that is seen as a partial solution to preservation, to access as the primary focus of the system. The two ideologies of collection development emerge from the interviews. The **edited collection** (also referred to as curated collection, web exhibit, boutique-collection, topical collection) includes the selection of highlights from the collections, organized topically. Also, it includes portions of collections rather than complete collections. The contrasting approach is an **archival collection** (the traditional, structured, comprehensive collection organized around genre or provenance with an aim of being comprehensive). These two models were contrasted by several of the informants. Others point to **hybridity** that was incidental, a result of compromise solutions. Regardless of the preference, the informants acknowledge that the problem of digitization as a tool for access and/or preservation remains unresolved.

I'd say it was a mix of the curatorial and administrative staff in each of the areas. Some of the more successful divisions tried to make the preservation link. And they would say it's a way to get around microfilming because I can make it available online and then I don't have to serve my originals, they can be under lock and key. The problem with that was that some of the technical specs were good for access purposes but not good enough for preservation purposes. So I think that a mistake was not to join the preservation and access early on. (P2)

I mean, I am just thinking that nobody was calling it preservation, they would just say, those were the donor's intentions. Or, that's the archivists' approach, that's what we have done at the National Archives for example: 'we process a collection like that.' What I am saying there could have been more attention given to what it was we were doing and why we were doing it; and potential user of the material, that the potential user was out of the equation. And I think that as a result some of the decisions were driven for reasons that are not supportable today. ... You could say it was an experimental project, nobody had ever done it before, so what did it matter, we did best we could with the available information. So I am not saying there were mistakes and, you know, they brought shame upon the library. It's just that knowing what we would know today, we would do things differently. I wouldn't repeat those models necessarily. (P2)

In assessing the approach used by the NDLP, one of the informants (P6) states that "one finds a mix of approaches," with both of these principles applied all along in the development of the DL system and its collections (AM). Moreover, the feature

“collection highlights” added to comprehensive collections provides an entry point to the collections, thus allowing an edited component to be integral to these collections. An emerging concept of selective digitization at the end of the five-year expansive phase of the NDLP (during which a staff of one hundred was working on the digitization projects) is seen as a pragmatic issue (P7). In reality, the existing AM collections were not comprehensive anyway due to practical problems during production (managing legal rights, conservation issues) that excluded a certain number of items (P3).

The selection process was seen as managed by a number of constituencies in and outside of the library, not necessarily as the result of an established policy.

On the non-print side, which is the special collections side, I think it was rather more a negotiation between the curators of the particular collections and the project managers. And that model I think has continued generally through the AM and the NDLP. The activity is one that succeeds when the participants have a certain level of enthusiasm, and are motivated to participate. I think this must always be true in large bureaucracies. ... Now in the [names division], they generally adopted the position, which is perfectly reasonable, that they have three or four very popular collections, they get a lot of people who want to see them, if they could get them on the web then fewer people would have to come to Washington. [Lists collections.] So that division was motivated to try to provide service, which among other things would reduce the number of people in the reading room, or even make it easier for people in the reading room to find things. And the people who manage AM, I think everyone found that to be perfectly agreeable and perfectly acceptable. So in that case the impetus came up from below, in the case of [names division], the impetus came down from above, rather more, and another factor came in to bear, which is donor interest. It's expensive to do these things, so we always have a list of collections that we hope someone would give us money for. And in the case of papers [lists collections], [names donors] gave us the money to digitize [lists collections]. And the division, I would think, had little or no interest to do it, very little desire to do it, and in part it was done with mild cooperation on their part but not strong cooperation. So those are two special collections divisions who have different models. (P1)

In addition to the recognition that there are numerous constraints that determine the process related to the definition of document, collection, and access, there is recognition that selection depended on power relations within the organization. Several relevant groups were interested in shaping the collections, whose philosophies of development

were in dialogue. These groups included the curatorial staff, DL staff, and interest groups (donors).

One of the informants (P1) summarizes criteria for selection in the following order of importance: (1) significance of collection and use level; (2) preservation / conservation need; (3) donor interest; (4) rights management plausibility; (5) heritage worthiness (American content); (6) technological plausibility; (7) availability of descriptive information to provide metadata; and (8) comprehensiveness of collections to meet the school curriculum for teaching American history.

But what you end up with is five or six factors. And you end up with work that takes place over a ten-year-period, different people in different years. And so the selection process is I think very much a process, it's a negotiation in which a number of different factors, including money being available, come into play. And sort of out of this process, and out of five or six factors, some things emerge and get done, and some other things don't emerge and don't get done. It's not a perfectly clear process, you know, you don't have an editorial board that meets and says yes and no about things. And I think that's correct, I don't think there's anything wrong with that, I think it's an organic, healthy, dynamic way to make progress in this. And all you can say is, 'well, we'll just do more and more and more if people are sorry this is left out, we can get to it next year.' It's an open-ended process. (P1)

Discourse around collection development was tied into the mission of the library and the search for the DL at the trajectory of access and archival functions. Although in these discourses there is a search for resolution, for an established systematic policy of selection, the process remains "open-ended" because the technological shift has not only affected the nature of the collection and professional means of organizing the collections for access, but also the nature of user expectation of access, and the uses in which the ideas of ownership and collection management are changed.

I think it's a sense of empowerment that you can use these materials without the intervention of the third party; that you get to interpret them yourselves. And for a teacher that you perhaps get to put your own spin on it. And when you pull one picture off the screen and can make it any size you want, I think that there's more of a feeling that you are touching holding a real photograph than if it's an illustration in your book. So I think there is the feeling that you are more in

control. And I do think that in the background of all the AM and the fact that we're using this K-12 audience was also the technology feature that the audience who knows how to use the Web ... So all of these factors are pulling themselves together, the thrill of technology, whether it's cutting and pasting and doing your own textbook, the feeling like you don't have any intervention, that you are dealing with the materials yourself and just the fact that it's on a computer and it's cool. All of that I think, makes it different ... And that last thing is the copyright challenge, the feeling that it's yours when it's not. No one would think that if I rip this page out of a textbook, I could photograph, I could photocopy this picture at will. It wouldn't occur to them; they are not, we are not socialized this way. We understand that it's a book; somebody else owns it. When you download it from the web ... you shouldn't have done that. Right? And you certainly should not take it and make a zillion copies you tore out of the book and distribute it. But when you click it on the web, it does not feel the same. ... Which is why we're looking to make sure that there's no ownership in those works themselves so that we can encourage this kind of recombination and creativity. (P5)

The interpretation of artifacts in context (and ultimately whether the archival or edited collections are better at supporting that type of access) ultimately depends on the definition of a document. Digital representations are not the same as books or articles and structured collections that are seen as bounded information objects, and this realization, as well as recognition that the new uses of the collections will determine the future process of development. The technological frames provided by the users will further inform the shaping of the collections.

IMPLICATIONS

The perceptions of digital library developers and the process presented here are reflective of what has been happening in many institutions during the initial digital library boom between 1996 and 2002 when technology-related processes transformed library institutions and shaped contemporary professional practice. What was learned from the informants' perception of how a digital library emerged and what the theory revealed about the forces of acceleration of innovation in the institutional context can be summarized in several points (focusing on technology, transformation, and personnel).

These points have implications for the developers of digital libraries in understanding how institutions can absorb transformational forces.

Technology. The basic premise of DL innovation is that it involves the use of technology and that resolving technological obstacles in moving collections online is central to DL system development. As interviews have shown, technology is secondary and the primary question is the issue of the purpose of the collections and the dichotomy between access and preservation. Making collections digitally accessible diminishes stress on physical resources but it changes the role of a person who controls access, thus introducing stress on organizational processes, and prompting a re-definition of the roles of the gatekeepers. It was surprising to see that the battle was not about technology but about pushing the organization into a digitization framework.

Transformation. One of the key themes in this study is organizational transformation (converting all segments of the organization “to the love of the digital” as one of the informants put it). In the organizational setting described here, people from different fields were involved with the process of digital conversion, while librarians became involved at the end of that process. Libraries respond to changes of information environment; as caretakers of information artifacts, librarians define their roles in relation to the changing nature of information objects. The technological shift is partly directed by and partly imposed upon the libraries, as shown here. In the process of innovation, the “old library” which stands for a politics of access and institutional processes, shifted its ideologies and practices of access.

The transformative forces in the library for the duration of the NDLP (1995-2000) rallied around a statement, “5 million images in 5 years” as a goal of digitization.

Measuring progress in quantitative terms provided a clear sense of what a successful outcome would be, and whether it has been achieved or not. In contrast to the ideological discourses of access and preservation, such non-ideological goal is not one on which it would be possible to disagree; it was a goal that could disengage any other goal and diminish negotiation between the different parts of the organization and the organizational field of librarianship. This simple concept ultimately served to assimilate, incorporate, and standardize differences within the organization as it brought about a fundamental shift of moving digitization from the periphery to the center (“everything is digital now”). That has been an actual outcome of the NDLP. As the views of the participants in this study have shown, there were obvious undercurrents of a cultural debate about the usability of the collections, and of the access vs. preservation approach, but these debates became primary only in the aftermath of the project itself. The cultural processes didn’t get fully engaged at the time of creation because of the simplicity of the goal. It was surprising that librarianship as an organizational field had comparably less impact on that transformation than had external forces: the impetus for the project came from outside the organization. Money mattered as well, as can be seen when the production mantra was invoked as innovators encountered obstacles. The simple assessment of whether a collection can help achieve a quota was used, thus making the process of what to digitize and what not to digitize opportunistic. The implication for practice is that it is important to find a simple theme encompassing a clear goal that can then be assessed in terms of an exact outcome.

Personnel. An eclectic group of people made up the staff of the NDLP and was charged with the task of creating new processes and new organization. Being from a

variety of backgrounds, they were not aligned with the existing blocs (in terms of professional values) but saw themselves as performing translation work. They measured their own success in terms of the production mantra of “5 million images in 5 years.” When they encountered obstacles, this mantra allowed them to remain neutral and unaligned with any particular view within the organization. This finding has a practical application in pointing to the usefulness of digitization teams consisting of people from diverse fields who have in their experience been accustomed to crossing boundaries. They need to have a clear allegiance to a particular goal (here it is loyalty to the “love of the digital”) that represents the larger coercive force. These individuals agreed with librarians on multiple levels but their activity was not constrained by existing models of practice. While the models of access based on the existing practice of librarianship may be more sophisticated, these models were not effective in supporting the goal of digitization.

LIBRARY HISTORY FROM A TECHNOLOGY PERSPECTIVE:

CONCLUDING STATEMENTS

As stated in the opening sections of this paper, this case study can be seen as a methodological exercise. It applies phenomenology to studying emergent phenomena; it taps into how social change was experienced by those who were participants and agents of that transformation. This methodological venue is aimed to extend library history research to the study of technological change in the library context, contributing to the argument that library history needs to include the theoretical approaches and methods of other fields to understand the processes of knowledge creation, circulation, and use in the institutional context. Applying an interdisciplinary approach, this study of technological

innovation (building a DL system) in the context of a national library (Library of Congress) approaches it as a process of social change, and from the vantage point of technological innovation in the library context. The sociology of culture and the social construction of technology frameworks provided the explicit theoretical bases for this study.

The processes of isomorphic change were explored from the point of view of innovators (builders of the DL system); their perspective provided an empirical insight into relations between society and an organization (Library of Congress); isomorphic processes within different parts of the organization; and processes within the organizational field (professional practice of librarianship). Semi-structured interviews with representative members of the NDLP team provided an insight into the negotiation of meanings of organizational transformation, and identification of critical issues in the process of institutionalization of the DL system. These narratives provide evidence of how organizational change is perceived by those who are responsible for generating that change (i.e., innovators as operants). As outsiders to the field of traditional librarianship, the innovators reflected on coercive authority from other organizations and the cultural expectations of society (coercive isomorphism) as well as on the normative pressures of the cognitive authority of the professional field. These forces determined the course of the adoption process.

The study demonstrates that the engine of organizational rationalization works through integrative forces that emerge around technological innovation through the agency of innovators, quickening through the integrative processes in the organization and negotiation of meanings of the technological invention. Thus, shifts in organizational

rationalization are directed through the agency of innovators and of society at large, but organizations have a powerful role in defining that process and bringing about homogenization within their fields.

The assessment of the flow of innovation within the organization, as perceived by the DL system developers, concludes with the emergent realization that there is a changing paradigm of the collections that will have an impact in redefining the technological frame of the DL in the next stage of development (post-NDLP) and that the larger degree of inclusion of users in the emerging technological frame for the DL system may be a key ingredient of that process.

Although the NDLP phase of development (1995-2000) officially ended, the innovators did not achieve an accompanying sense of semantic closure. They recognized the heterogeneity and open-ended nature of the process of development and this confirms the hypotheses about isomorphism as a homogenizing force when invention circulates from one direction to the other [3]. As emphasized, integrative processes and the effect of external isomorphism (of the society upon the organization) will be shaped by the new uses of the collections to which the “old library” (with its established professional practices not yet integrating the technological innovation) needs to respond. In terms of the organization itself (Library of Congress), the process of the integration of the “new library” (the DL system) and the “old library” had just begun in 2002.

The informants (DL system development staff) experienced the emergence of the NDLP as a response to coercive isomorphism (authority from other organizations such as the Congress, donors, and the cultural expectations of society). These forces determined the NDLP goals and priorities and initiated the course of adoption of the emerging DL

technology in the library system. As they described the response to the NDLP in other parts of the organization, they referred to two issues: (1) integration of project activities with activities of the standing divisions in the Library for the duration of the project, and (2) integration of digitization activities in the Library. They concluded that one of the outcomes of the five-year project is a transformation of organizational culture. There is also a recognition that the emerging technological frame for the new collections is an open-ended process (of re-definition of the collection/document, and access/use) and an overall shift from preservation to access in defining the DL technology. Because of the dominant role of the Library of Congress in resource centralization and professional practice, this process is significant in the broad organizational field in which the adoption of DL system as a new technology of access and use of information is a central concern. Although these concerns appear new, they are in fact part of an ongoing process of innovation in the library context.

A desire to provide a bibliographic map of the world's knowledge in the information explosion after World War II defined technological innovation in the library world when Online Computer Library Center (OCLC) was established 1967. Mainframes of the 1960s, the microprocessor in 1971, the personal computer in 1981 and the World Wide Web in the 1990s have shaped the course of innovation in libraries as much as “non-technical values of cooperation, sharing and working together for the public good” [10, p. 22]. This integration of technological innovation within institutional framework has involved professional idealism of librarians as technology innovators, belief in “progressive” technological development of the society at large, and continued diffusion-oriented national technology policy focusing on knowledge infrastructure as basis for

improved information services for scientific and technical information [11]. Consortial organizations dealing with technology on a large scale have been the preferred mode in that development. These forces provide a legitimacy arena for capability-enhancing technologies for information access in the context of library institution (i.e., “working together for the public good”). An insight into the dynamics of these loci of control (not always in perfect convergence) can only be understood with in-depth study of innovation seen as an interpretive arena for relevant social groups involved in shaping and understanding technology. The investigative modality for the study presented here is an exhaustive description that consciously works to produce a realist narrative tale that acknowledges the distinct voices that shaped innovation. The history of technological innovation in the library context could be further explored, focusing on selected developments, such as formation of OCLC, or the current convergence of consortial organizations dealing with technology. Coherent stories of development of large-scale technological systems, and multi-layered interpretations of technologies are possible within that framework. In fully exploring the power dynamics around technology, both successful innovation and failed technologies should be examined.

Bruno Latour’s “Aramis, or the Love of Technology” [12] is a tale of an automated transportation system for France that was designed (1969-1987) but never built. A parable of technology and modernity, this account is properly based on blueprints, documents, and interviews; it merges different voices including the technological system itself. The paradox of bringing to life inanimate technology in this constructivist tale of innovation asserts that truth is multi-layered but also that technology is not neutral. Technologies are not only technological – they are social inventions as well. For

historians/sociologists of libraries this calls for a holistic understanding of how technology is integrated with the ideas of professional idealism and the environment in which we build an online infrastructure for information access.

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Table 1: Involvement with the National Digital Library Program (NDLP) (N=7)

Participant codes	Function (LC & NDLP)	Length of involvement with NDLP (in years)	Roles (organization-related)	Roles (domain-related)	Roles (related to knowledge life cycle)
P1	administrator: planning activities; initiation of the project; overall coordination for non-print and AM; technical coordinator for preservation	5 post-NDLP reorganization	core staff	content other (evaluation)	policy project management
P2	initiator of new projects; public service collections administrator	4 post-NDLP reorganization	n/a	services other (evaluation)	policy utilization
P3	digital conversion specialist; individual project coordinator	2.5	core staff	content culture	project management
P4	digital projects coordinator for digital conversion activity; digital project coordinating team supporting multiple divisions	3 post-NDLP reorganization	core staff	content	policy project management
P5	legal specialist for digital publishing rights licensing, purchasing copyright deposit; legal sufficiency/risk project overview	2	n/a	culture	policy
P6	NDLP reference service; help desk; outreach and education; editorial handbook	5	educational services staff	services	policy utilization

P7	architecture infrastructure (generalist); NDL competition coordinator	5	core staff infrastructure staff	technology content other (evaluation)	policy project management
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NOTE: Two coding schemes are used to refer to the informants' roles in the NDLP. They are based on the existing schemes used in identifying the digital library staff. Planning documents of the NDLP (1995) [4] distinguish curatorial staff, core staff, infrastructure staff, and educational services staff. These categories identify different types of staff in terms of organizational setting (the library). Another categorization identifies staff in terms of domains including content, services, technology, and culture, including a category of other (evaluation, impact) [5, s.v.].

Table 2. Research Objectives and Interview Questions in Relation to Theoretical Framework

Research Objectives	Interview Questions	Loci of Control	Historical Frames	SCOT Framework
1 DESCRIBE the informants' self-perception of their roles, involvement with the project and career paths, mediation and involvement with other socially relevant groups	1-2	normative pressures (profession)	genesis	mediation
2 IDENTIFY formative events and project landmarks as perceived by the protagonists	3, 4	mimetic processes (organization)	genesis to agency	interpretative flexibility cornerstone closure
3 DESCRIBE the organizational field, institutional processes—project and departmental, client relations of related institutions and with society at large	5-6,10,14	coercive isomorphism (society) mimetic processes (organization) normative pressures (profession)	agency	interpretative flexibility
4 IDENTIFY issues that provoke conflict: barriers, negotiation, and conflict resolutions	4, 11-13	mimetic processes (organization)	agency	stabilization & closure

NOTE: Social context imposes the loci of control in the process of institutionalization. These loci of control are exerted through regulative processes originating in the external environment, norms of behavior and moral codes of the communities of practice, and the power blocs in the institutional context [3]. Historical frames for digital library system development (NDLP) include genesis (emergence and developmental stages of the project), and agency (in the meaning of end or a means of control achieved, being in action, exerting power; effectuation, implementation). SCOT framework identifies the involvement of socially relevant groups in the social construction of technology. They are more or less mediated in regard to the proximity to technology and interpretation. The

questions (Q1-14) are reproduced in full in the Interview Guide, in the Appendix of this article; the discussion of the interview process as related to theory is included in the accompanying article, Part I in this issue.

Table 3. Definitions of Key Concepts in the Social Construction of Technology (SCOT)

Framework

SCOT Concept	Definition
<i>relevant social groups</i>	All individuals organized in a social framework around the socio-technical artifact who are involved in shaping it, from users to engineers
<i>interpretative flexibility</i>	semantic variation around definitions of technology by different social groups
<i>technological frames</i>	purposive interpretations by different groups that provide a semantic frame for the specific use of that technology that may not coincide with another group's use such as the distinction between the use of digital libraries for preservation or access to digitized materials
<i>stabilization and closure</i>	stages in the process of adoption and adaptation
<i>semiotic power</i>	the ability of particular meaning of a technological artifact to emerge as one that has credibility, thus attracting new social groups sharing that idea

NOTE: The Social Construction of Technology (SCOT) framework and the application of this theory to this case is discussed in more detail in the accompanying article in this issue, Part I.

Table 4. Key Concepts of Institutional Isomorphism and Institutional Change Framework

Processes of isomorphism	Definitions	Loci of control
<i>coercive isomorphism</i>	results from coercive authority “from other organizations upon which they are dependent and by cultural expectations in the society within which organizations function” [3, p. 150]	<i>society</i> (pressures, norms and legitimacy; consensus processes involving the American public and the Congress; values related to technology environment)
<i>mimetic processes</i>	result from symbolic uncertainty in the environment and organizational response to that uncertainty; operants engage in problemistic search that may have a ritual aspect when companies adopt innovations to enhance legitimacy, and to demonstrate that they are improving efficiency [3, p. 151]	<i>organization</i> (the transformative processes or existing organizational practice, referring to the Library of Congress and its divisions)
<i>normative pressures</i>	exerted by the requirements of professionalization and cognitive authority of the organizational field [3, p. 152]	<i>profession</i> (librarianship, (digital) librarianship, organized professional interest)

NOTE: The sociology of culture and the institutional isomorphism framework and the application of this theory to this case is presented in the accompanying article in this issue, Part I.

Table 5. Mediation and Relevance of Relevant Social Groups in DL System

Development

Entity	Relevance	Mediation
Congress	Low	High
Society at large (the American public)	High	High
Librarian of Congress	High	High
NDL project staff (LC)	Low	Low
Technologists (LC)	Low	Low
Curators (subject specialists) (LC)	High	High
Librarians (LC)	Low	High
Divisions (LC)	High	High
Funders (corporations, donors)	High	High
Users (individuals)	Low	High
Other libraries	Low	High
Professional networks	Low	High

NOTE: Low relevance value indicates that the group is seen as having a low impact in shaping the content of the digital collection. High relevance value indicates that the group is considered important in collection development decisions. Low mediation value indicates that there are less intermediary stages in the effects that the group has in shaping a particular technology; high mediation value indicates a high level of mediation.

Appendix: Interview Guide

1. Please briefly introduce yourself in terms of your background, work experience, and position in the institution.
2. How would you describe your involvement with the digital library initiative at your institution?
3. Can you identify the key stages of the development of the digital library initiatives in your institution?
4. What were the major revelations for you in managing the process of building digital libraries in your institution? What were the major barriers for the institution in developing your library digital library initiative (in terms of developing content, methods of delivery, resources)? How does this differ from your initial expectations of what would be the major obstacles in managing the process of building the national library collections?
5. What do you think is the uniqueness of that process in your institution?
6. What do you believe is the nature of collection development for digital libraries in relation to cultural heritage? How does this process differ in relation to traditional collections?

State several items that highlight the similarities.

State several items that highlight the differences.

Give examples that show how digital libraries are distinct from traditional collections.

7. What are the features of your collection that would appeal to someone looking from the outside, from a different culture, at the materials you have digitized?

What are your concerns related to national and international context of use?

- How is the availability of the documents on the Web affecting the selection processes?
8. Are you aware of the new uses of the collections or the library resources as a result of your library digital projects? Please give several examples of how the uses of the library have changed specifically as a result of the new projects. How does that affect the mission of your library?
 9. What are some of the strategies that you have applied in your digital library pages for different types of audiences and uses?
 10. Who is involved in the development of the digital libraries in your institution?
 - Are the librarians only involved in the process of negotiation?
 - Provision for input by non-librarians?
 - State external forces involved in policy-making related to building digital libraries.
 11. Choosing two institutional digital library initiative subparts that you are most familiar with, please identify the criteria for selection. How do they differ?
 12. Again using the same two projects, describe the process of negotiation that went on in building the digital collection: who was involved, how was the work organized, what were the units affected by this process?
 13. Reflecting on the same two projects, identify what went well, and what were the crises you encountered.
 14. In all, how does the approach in your institution differ from other institutions?