# Standing strong in the winds of change: an analysis of a Document Delivery Service in South Korea

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**Abstract**

**Purpose** – This paper aims to review the evolution of a nation-wide Document Delivery Service in Korea over the past decade, focusing on how the service has been reconfigured to sustain and fortify its position as a central channel for accessing information in the era of abundant digital resources.

**Design/methodology/approach** – The impacts of policy changes and technical improvements introduced incrementally over the years on the advance of the service are analyzed. The overall statistics over the period of 14 years are first presented to show the changing trends of the service, and the transaction log of the period of nine years is analyzed in detail to examine the impact of policy implementation and technical advancement on the quantity and quality of the service.

**Findings** – The transaction log analysis has uncovered the two main themes or directions of changes that have contributed to its robustness. First, changes introduced to streamline the service process both on the request end (unmediated requests) and on the delivery end (electronic delivery) have brought a sizable improvement on the speed of the service. Second, efforts to incorporate various resource-sharing activities into a unified service framework have led to an enhanced efficiency of the service as well as an increase in volume.

**Originality/value** – The empirical data demonstrating how managerial and technological changes have contributed to sustain the value of the service can be valuable benchmarking data for other services facing the same challenges.

**Keywords** Academic libraries, Document delivery, Resource sharing

**Paper type** Case study

## Introduction

Interlibrary loan (ILL) and Document Delivery Service (DDS) represent the long history of the library community's efforts to support users' information needs beyond the limitation of individual library's collection. The role of ILL/DDS as a primary means to widening access for users, however, has been challenged in the "digital" era. With the wide availability of digital resources and services, the range of information that users have at their fingertips has greatly expanded, which, in turn, has heightened user expectations for faster and easier access to information. Given these changes, it is not surprising that questions arise as to the role, value or capacity of ILL/DDS in this era.

Unfortunately, empirical studies and reports on ILL/DDS have offered a mixed bag of answers. On the one hand, a number of studies showed that the volume of ILL/DDS requests had declined over the years at various levels (e.g. in an individual library, a consortia or a nation) and across countries (Kidd, 2003; Echeverria and Barredo, 2005; Egan, 2005; Johnson, 2011). The decline of ILL/DDS was often attributed to the increased availability of electronic resources, especially the prevalence of electronic journals and, in particular, the so-called "Big Deals". Others find a reason for the decline in issues of service quality. Among others, it is pointed out that DDS fails to meet the expectations of users who are accustomed to the immediate access to digital resources, due to the time lag in processing requests. On the other hand, some services report no decrease or even a stable trend of increases in the volume of requests (Mak, 2011, 2012). As for the reasons, it was posited that the increased awareness, thanks to search services, may engender new needs, trading off with the diminished requests elsewhere (Lacroix and Collins, 2007). While it becomes much easier to discover resources of interest through online databases and web search engines, much of the full-text still remains not readily accessible digitally or resides beyond the reach of individual users or institutions. The reasoning is that becoming aware of resources without having full access to them would lead to more demands for ILL/DDS (Jackson, 2004; San Jose and Pacios, 2005; Willett, 2009). Regardless of external factors, the volume of ILL/DDS continued to

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increase in some libraries or consortia, and it was largely attributed to the improved quality and efficiency of the service in question (Mak, 2011).

All in all, while the challenges faced by ILL/DDS at any unit are real and substantial, their impacts are not uniform and not necessarily adverse for the services. A question of importance, then, is how do some services rise above the challenges while others do not. To answer the question, it would be useful to examine cases of thriving services and see what can be learned from them. This paper will present such a case study from Korea. Since 1999, this service has gone through a number of changes and has become a critical channel for information sharing among academic libraries in the country.

The purpose of this study is to identify the factors that contributed to the growth and sustained value of Korean Education and Research Information Services (KERIS) DDS. In particular, we will focus on the changes introduced to the service over time in response to the changing needs and expectations of both users and participating libraries, and evaluate the impact of those changes on both the quantity and the quality of DDS, by examining the transaction records.

In the following, we will first give an overview of KERIS ILL/DDS with the overall service statistics for the past 14 years, then we will analyze the transaction logs for a period of nine years, focusing on the major changes introduced to the service in that period. The observed impacts of those changes and their implications will be discussed, followed by concluding remarks on some lessons learned.

## Background

### KERIS ILL/DDS

KERIS holds a unique position in library resource sharing in Korea. It is a government-funded agency aiming at promoting public education and enhancing the research competitiveness of the country. As part of its mission, among others, KERIS has fostered a large-scale cooperative network of academic libraries by establishing the key infrastructure for resource sharing, including the first national union catalog of academic libraries[1].

In 1999, relying on the union catalog, KERIS developed an ILL/DDS system, called Library to Library (L2L), which is a client-server system based on the International Organization for Standardization (ISO) ILL protocol for exchanging a series of messages between libraries related to ILL/DDS requests and their subsequent processing. In March 1999, a pilot service for document delivery was started with ten libraries. Upon the successful operation of the pilot service, in October, KERIS started to form the consortium targeting all universities and four-year colleges. By the end of 1999, 97 libraries had joined the consortium. From 2001, the consortium expanded to include two-year college libraries, research libraries and some special libraries, growing to 359 libraries by 2003. In March 2004, a major upgrade of the system was undertaken, which coincided with the migration to the current Web-based system, called Web ILL (WILL). In 2004, in addition to document delivery services, the member libraries started lending services for returnables. By the end of 2012, KERIS became the largest ILL/DDS network in Korea (Lee, 2013). As of 2014, 564 libraries are participating in the ILL/DDS cooperative network, using the WILL system.

### Overall statistics

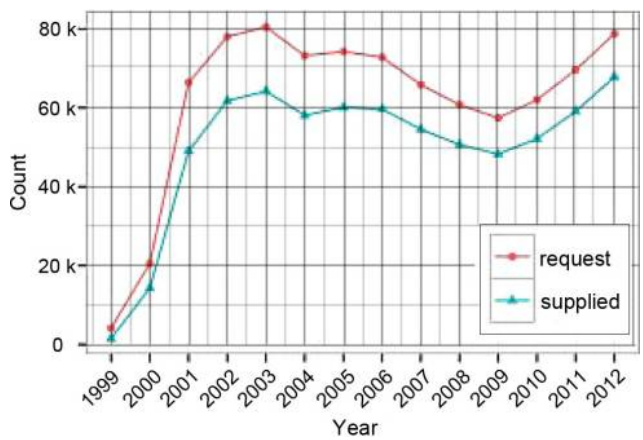
While KERIS provides both ILL and DDS, for the rest of the paper, we will discuss only the document delivery (non-returnables) part of the service, as the service for returnables started later, and the vast majority of the requests so far have been for copies rather than for returnables.

Over the 14-year period, 864,014 DDS requests were handled. Figure 1 shows the overall service statistics from the beginning of the service in 1999 to the end of 2012. As can be seen, the number of requests showed a steep increase at the beginning of the service, in tandem with the growth of the consortium. Between 2000 and 2001, the number of member libraries increased from 107 to 243. This explains, to a large extent, the steep growth in DDS requests in 2001. By the end of year 2003, the number of member libraries grew to be 359 libraries, which accounts for more than 70 per cent of university libraries in Korea. Along with this expansion, the number of requests peaked in 2003 at 80,471.

However, the volume of requests decreased in 2004 by 9.1 per cent (73,160). The number more or less plateaued in 2005 and 2006, but then noticeably declined for the following three years (on average, a 7.6 per cent decrease annually). In 2009, the number of requests marked the lowest point at 57,395 – a 29 per cent decrease from the peak in 2003. This period roughly coincides with a major initiative for licensing electronic journals in Korea (Shin, 2008), and it is presumed that the increased availability of electronic journals took a toll on the DDS. In fact, according to the results of a survey conducted by KERIS in May 2004, those libraries that showed a substantial reduction in their DDS requests chose the expanded electronic journal subscriptions as one of the main reasons for the decrease in DDS usage (KERIS, 2006).

The downward trend, however, was bucked in 2009, and the requests have increased by 12 to 13 per cent annually since then. By 2012, the number of requests has recovered almost to its peak level. It should be mentioned that, during this period, electronic journal subscriptions across academic libraries have shown consistent growth. In other words, the external factor that had caused the initial reduction of DDS in the first place was still intact. This raises an interesting question. How does this turnaround happen in the presence of the same, or perhaps stronger, adverse effect? The focus of the rest of this

**Figure 1** The volume of requests over time



paper is to analyze the factors that contributed to this turnaround.

Another noticeable trend shown in Figure 1 is that the fill rate has improved. If we compare the numbers in 2012 to the numbers in 2003, where the requests peaked, while the total number of initiated requests in 2012 is a little lower (80,471 vs 78,720), the number of supplied requests is higher (64,220 vs 67,797). The fill rate has grown from 79.8 per cent in 2003 to 86.1 per cent in 2012. In fact, the fill rate has been increasing steadily from the beginning of the service, showing an average increase of 1.4 per cent annually. As will be discussed in the following analysis of transaction logs, turnaround time has shown even greater improvements, as a result of the targeted efforts for streamlining the service process. All in all, while the volume of requests showed some turbulence, the quality of the service continues to be improved over the years.

## Transaction log analysis

In this paper, we consider 1999-2003 as the first phase of the KERIS DDS, where the initial infrastructure for the service, including the system and the consortium, was established and the service has grown substantially. The migration to the Web-based WILL system marked the beginning of the second phase. In this phase (2004-2012), as discussed above, the service went through some turbulence most likely due to external factors such as expanded electronic journal subscriptions in Korea. At the same time, a number of changes in policies, workflows and technical components were introduced to the service which, we believe, were instrumental in sustaining its value. To examine the impacts of those changes on both the quantity and quality of the service, we will analyze the transaction log data covering the second phase of the service.

The data include 603,081 completed transactions processed by member libraries from March 2004 to December 2012. In this data set, there were 510 requesting libraries and 449 responding libraries. In the following analysis, we are going to focus on two main directions of KERIS policies and technical advances introduced in this phase – first, streamlining the service process, and second, providing a unified platform for resource sharing.

### Streamlining the service process

*Direct user requests*

In 2007, KERIS changed its policy and started to allow the requests initiated by individual users to be transferred directly to responding libraries. Before this change, although a user could submit his/her requests electronically using the KERIS Web interface after searching the union catalog, such requests needed to be approved by his/her affiliated library before sending to the responding libraries. This approval process was implemented to prevent unnecessary service requests in case, for instance, the affiliated library already has the resource but the user failed to find it. Over time, however, it was recognized that the costs in terms of the delays in request processing outweighed the benefits. Therefore, starting June 2007, users were given an option to submit a DDS request without specifying their affiliation and, thereby, to send the request directly to the responding libraries without the approval step. The option of routing the request through the affiliated library (semi-mediated request) was still available, though, for users who preferred it for various reasons. For instance, if there is a preferable fee agreement between their own library and the responding library (as will be discussed later), the second option may be more attractive.

As can be seen in Figure 2, the number of direct user requests increased gradually every year from 1,817 requests in 2007 to 10,408 requests in 2012. The direct user requests increased substantially, even in those years where the total number of requests were decreasing and reached over 13 per cent of total requests.

Apparently, the reason for introducing direct user requests was to shorten the turnaround time by removing the approval step. To examine the actual impact of this change, Table I compares the processing time of the two types of requests that users may initiate via the Web interface (semi-mediated requests vs unmediated/direct requests). In other words, the table shows the differences between requests with and without the approval step. Note that, to see the difference without the effect of shipping methods, instead of turnaround time (from request to receipt of the requested document), processing time was calculated from the point of submitting a request to the point when the responding library updated the status of the request to "shipped".

As can be seen in Table I, the processing time was considerably shorter for direct user requests. Overall, direct user requests were processed (requested documents were shipped) in about 24 hours on average, whereas an average of 39 hours was taken for semi-mediated requests to be processed. In other words, about 15 hours on average were spent for the additional approval step in case of semi-mediated

**Figure 2** Number of requests by request type

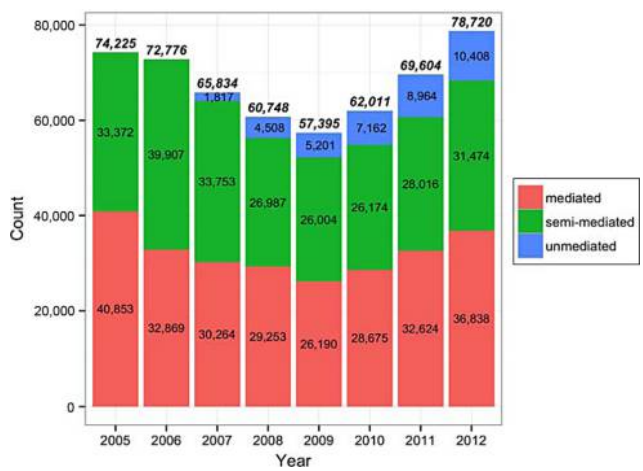



**Table I** Processing time (hours) of unmediated (direct) requests vs semi-mediated requests

| Year | Unmediated (hours) | Semi-mediated (hours) |
|---|---|---|
| **2007** | 27.28 | 42.13 |
| **2008** | 27.72 | 46.29 |
| **2009** | 24.03 | 39.15 |
| **2010** | 22.71 | 37.13 |
| **2011** | 22.22 | 33.21 |
| **2012** | 24.53 | 34.31 |

requests. However, it is noticeable that regardless of the request type, processing time has been reduced consistently over time, testifying again that the service quality has been continually improved.

*dCube (electronic document delivery)*

While the request side of DDS was improved with the introduction of an unmediated service, it was noted that progress on the delivery side was also needed. Upon requests from member libraries, KERIS started to investigate possible options of electronic document delivery (e-DDS), which eventually led to the development of a new e-DDS system called dCube. The dCube system was developed in 2009 under the auspice of KERIS and with the involvement of its member libraries in requirement analysis and pilot system evaluation. The Web-based dCube client was seamlessly linked to the KERIS DDS system, WILL and e-DDS launched in 2010. For more details on dCube system development, see Lee (2013).

Table II divides transactions between 2010 and 2012 into two groups, dCube delivery versus other shipping methods, and shows the number of requests, the fill rate and the turnaround time (in days), respectively.

A few observations can be made in Table II. First, within just three years, there was a remarkable growth of transactions completed with dCube delivery, with a more than five times increase from 2010 to 2012. In 2012, the dCube transactions accounted for about 45 per cent of the entire DDS transactions. Second, the turnaround time, as expected, was substantially shorter in dCube transactions. On average, it took about 1.07 days or 24.7 hours for a transaction to be completed. Not only were the majority of transactions processed within 24 hours but 40.8 per cent of dCube requests were delivered to the requesting libraries within 8 hours. Note that, due to copyright concerns, the digital copies are transferred to the requesting libraries, not directly to individual users.

Figure 3 presents the overall performance of KERIS DDS in terms of turnaround time, which has improved over time as a result of these efforts for streamlining both the request end and the delivery end. As shown in the figure, the improvement has been dramatic. In 2007, the average turnaround time was 125.8 hours (5.24 days). In 2012, it was 69.1 hours (2.88 days).

## Providing a unified platform for resource sharing

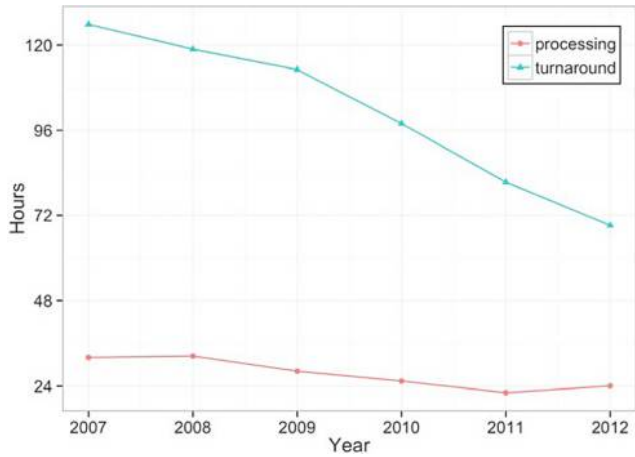
*Group support*

This second part shows efforts by KERIS to integrate regional and other initiatives into its infrastructure and, thereby, serve as a unified platform for resource sharing among academic libraries.

**Table II** Comparison of dCube delivery and other shipping methods

| Shipping method | Year | Request counts (% over the total counts) | Fill rate (%) | Turnaround time (days) |
|---|---|---|---|---|
| dCube delivery | 2010 | 6,630 (10.7) | 90.00 | 1.06 |
| | 2011 | 19,573 (28.1) | 90.76 | 0.94 |
| | 2012 | 35,102 (44.6) | 90.80 | 1.15 |
| Other shipping methods | 2010 | 55,379 (89.3) | 87.58 | 4.45 |
| | 2011 | 50,031 (71.9) | 87.56 | 4.40 |
| | 2012 | 43,618 (55.4) | 88.37 | 4.34 |

**Figure 3** Processing time and turnaround time




In general, a library can be a member of multiple cooperative bodies, including a regional consortium, a subject-oriented consortium, etc. In Korea, there exist various resource-sharing initiatives at a local or a national level. As KERIS grew to be the largest resource-sharing network, building upon the first national union catalog of academic libraries, a need for coordinating with other consortiums or groups arose, as virtually all their members joined KERIS. These groups often operate with preferential pricing policies or other terms of agreements among members, that may be different from those of KERIS. To accommodate member libraries' needs for better management of various resource-sharing activities, KERIS introduced the group feature into its system. This feature allows libraries to register groups formed outside of the KERIS system and to apply their group policy exclusively to their members. So instead of imposing flat-rate pricing policy for all participating libraries, KERIS enables a regional consortium or a group of libraries to adopt a differential fee based on their own policies and consortium agreements. In other words, local consortia can operate within the well-established infrastructure that KERIS provides, including the union catalog, shared cataloging system and ILL/DDS system, without compromising their policies. From the perspective of individual member libraries, this eliminates the need to juggle with different channels/systems for different consortia and, thereby, improves the overall efficiency of resource-sharing activities.

The group feature started to be used in 2004 with eight registered groups. By the end of 2010, the number of registered groups grew to 25. As new groups were added, the percentage of those transactions between libraries belonging to a group also increased, starting from 4.2 per cent in 2004 to over 10 per cent after 2010.

*Foreign research information center*

In 2006, the Korean Ministry of Education and KERIS launched a new resource-sharing program. Several national universities and a few renowned private universities were designated as Foreign Research Information Centers (FRIC), each focusing on one subject domain or field (medicine,

engineering, information technology, humanities, social sciences, management, agriculture, etc.) These centers subscribe to current foreign journals, and provide a nationwide DDS to users of academic libraries free of charge. Requests for documents can be placed via the KERIS ILL/DDS system. Initially, one national university library was selected as a center in 2006, but six more were added in 2009 and two more in 2011. By 2014, ten centers were in operation, with one more center added in 2013. This service was much welcomed by users, especially after 2009 when multiple centers were in service. In 2010, 3,927 requests were filled by seven centers, almost tripling in 2011 to 11,256 requests. In 2012, nine FRIC centers processed 19,805 requests from 316 libraries and 1,134 individual users (via direct request).

Figure 4 shows the proportion of group transactions and FRIC transactions out of the total requests in a given year. It demonstrates the effect of consolidating various resource-sharing activities into the KERIS system. A large portion of the increase in the service volume in recent years came from group/FRIC transactions. It is apparent that, without group/FRIC transactions, such a strong rebound from the fall in DDS usage might have not been possible.

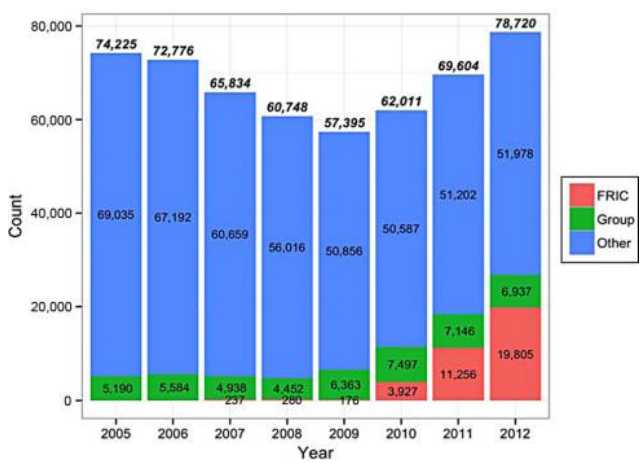
## Discussion

The past few decades saw remarkable changes in information infrastructure which transformed, to a large extent, the way information is produced and disseminated. The availability and consumption of digital resources became a norm for users rather than a rarity, and as a result, users have become accustomed to fast access to a wider range of materials. The changes in the information environment pose unique challenges to a long-standing library service, ILL/DDS.

In this paper, we introduced the KERIS ILL/DDS and looked at how the service has evolved to meet the challenges, by reconfiguring its service policies as well as enhancing the technical infrastructure. In particular, we analyzed the transaction logs of DDS over nine years, focusing on two main directions pursued by KERIS to improve the service and widen its reach during the period. The first direction was to streamline the service process. In the request end and the delivery end, a new policy (direct user request) and a new technology take-up (dCube electronic delivery), respectively, brought about remarkable improvements in the turnaround time for document delivery. According to (Connaway and Dickey, 2010), a number of recent studies on user behavior commonly found that convenience/speed of access is one of the most important factors affecting users' choice of channels for finding information, regardless of the specific contexts of information needs. Furthermore, the convenience/speed factor sometimes outweighs the quality or content of resources (Connaway *et al.*, 2011). This suggests that to promote library services in general and ILL/DDS specifically, it is critical to make it easy and fast for users to access resources through the service. Changes in the request/delivery method have been found to be key contributing factors to an increase of ILL/DDS usage, either in individual library or in a consortium as a whole (Mak, 2011). The results of this study add another testament to the importance of streamlining the service process to meet users' expectations.

The second direction was to create a unified platform for various resource-sharing activities. Over the years, KERIS has played a leading role in fostering resource sharing among academic libraries in Korea. In recognition of the needs for supporting regional cooperation and specialized services, KERIS has provided systems and services to the library community, so that various resource-sharing initiatives may co-exist and cooperate within its service framework. The transaction log of KERIS DDS shows that a large portion of recent transactions came from such initiatives. From the perspective of participating libraries, having a single channel of communication improves the workflow of processing DDS requests, both in requesting and responding. The positive impact was observed not only in the increased quantity but also in the augmented performance of the service.

**Figure 4** Request counts by transaction types




## Conclusion

The changing information environment calls for a reassessment of traditional library services like ILL/DDS in light of their appeal and value to library patrons. Observing seemingly widespread decline in ILL/DDS usages, researchers and library professionals have urged reconfiguration of the services to better meet users' expectations in the era of abundant digital resources (Jackson, 2005; Oberlander, 2007).

In this paper, we have presented the case of KERIS ILL/DDS, where improvements in the service infrastructure have made a sizable impact on service usage. It provides an insight into how to promote ILL/DDS services and offers valuable benchmarking data for other services facing the same challenges.

## Note

1 The union catalog was constructed by a forerunner of KERIS, the Korea Research Information Center (KRIC), and was taken over by KERIS.

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