A study to evaluate the digitization level of Korean libraries (part II)

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Abstract

Purpose – The purpose of this paper is to evaluate the current digitization levels of Korean libraries by identifying key elements of library services and measuring them for conventional vs digital approaches and use.

Design/methodology/approach – The study utilized previous research related to digital libraries and consultations with experts to arrive at 13 evaluation elements and components within them to analyze. For the purpose of this study specialized libraries, college and university libraries, and public libraries were surveyed, and their responses analyzed to rate their current digitization levels vs more conventional approaches.

Findings – First, after determining the elements that characterized the conventional and digital libraries by analyzing different pieces of literature and consulting with experts, 92 factors were identified for each of the conventional and digital elements based on the axis which was composed of 13 items. Second, this study indicated that the libraries obtained one of the conventional or digital characteristics independent of the situation, rather than that the digital library was more effective than the conventional library. Third, in evaluating the chosen libraries used as the examples, it was observed that the libraries had more conventional characteristics among the elements of the digital and conventional libraries. Also, based on the axis used for comparison of 13 items, elements such as the next generation service, the SNS service, and the library program service were more conventional, but elements such as classification and cataloging, acquisition, and the organization were more digitized.

Originality/value – This study is the first study in the world to measure the level of digitization of the library. Therefore, hereafter, each library will be able to measure and determine its digital position based on these elements. Up to now, some research was performed in pursuit of extracting the elements of a library but it had relied solely on literature review. Comprehensive research had never been performed as in this study.

Keywords Digital library, Conventional library, Elements of the digital library, Level of digitization of the library, Evaluating the digitization level, Evaluation elements

Paper type Research paper

1. Introduction

This research study was undertaken to evaluate the current digitization levels of Korean libraries by identifying key elements of library services and measuring them for conventional vs digital approaches and use. A better understanding of this issue was thought to be essential to comprehend where things currently stand and to allow for development of the libraries of the future.

The study utilized previous research related to digital libraries and consultations with experts to arrive at 13 evaluation elements and components within them to analyze. For the purpose of this study specialized libraries, college and university

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libraries, and public libraries were surveyed, and their responses analyzed to rate their current digitization levels vs more conventional approaches.

A large volume of information resulted and a decision was made to present the findings in two parts. This is part II.

In part I, the results of the literature review are intensely analyzed and presented. The process by which the items for evaluating the digitization levels were determined is discussed and the elements identified. The components that make up each element are presented in a chart and coded for easier analysis. Additionally, the results for the first eight of the 13 elements with respect to the digitization levels broken down by the type of library are presented and summarized (Noh, 2016).

In part II the digitization levels of the remaining five elements with respect to their digitization and library type are presented and summarized. The contents and classifications of the indices for evaluating the levels chart is repeated in this paper to help the reader to understand the data. Additionally, data are presented which analyzes the libraries as a whole on both the elements and the items within them. A detailed discussion of the digitization levels in these libraries is followed by recommendations for where to conduct additional research to shed further light on this issue.

2. Research questions

This study aimed to discover and enumerate the elements of the digital library and measure how much an individual library was equipped with the characteristics of the digital library accordingly:

RQ1. What determined the elements of the conventional and the digital libraries?

RQ2. Was any research performed to figure out the elements of the digital library?

RQ3. Did the researchers insist that the digital library was more effective than the conventional library?

RQ4. In selecting a library as a sample, which attributes were most selected and included among the elements of the conventional and the digital libraries?

RQ5. According to the axis of comparison, which areas were the highest and which were the lowest?

This study was intended to solve the stated questions above, and discuss them in the result section below.

3. Research design and methodology

3.1 Research process

As mentioned above, the results of this research are presented by being divided into the two parts. And, if we were to concisely express the details of each part, they are as in Figure 1.

If we were to develop the items for evaluating the digitization levels of the libraries and if we were to specifically describe the research procedure based on the evaluation items that have been developed, they are as the following.

First, research on the characteristics and the representative services of the digital library were comprehensively reviewed.

Second, examples of the library services that were being considered for the next generation digital library were investigated to compare with the conventional library services.

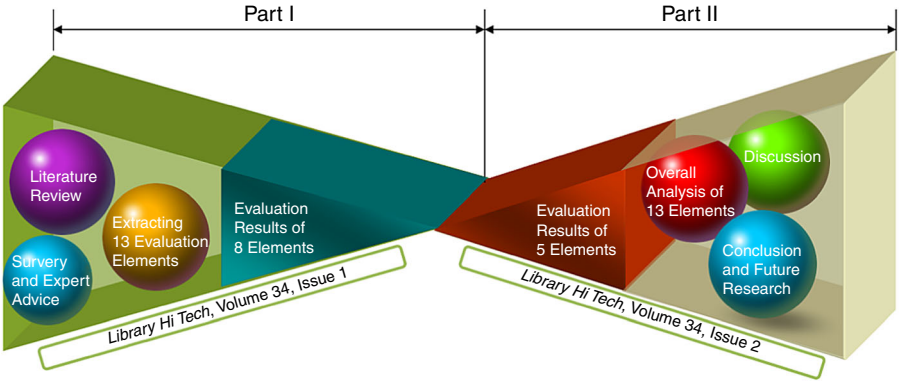

Figure 1.
Research process and methodology

Third, the elements of the conventional and the digital libraries initially extracted were examined by ten experts. These experts were composed of researchers and professors specializing in digital libraries, and career librarians who had worked in the digital library field for at least ten years and the elements were verified through discussions with them.

Fourth, 19 university libraries, 16 public libraries, and 17 special libraries were selected in accordance with the verified elements of the conventional and the digital libraries to measure the digitization level of the libraries.

3.2 Contents and classifications of the index for evaluating the level

As mentioned in part I of the study, ten expert advisors were consulted to arrive at the thirteen elements of the axis of comparison. They are as follows: acquisition, book collection, classification and cataloging, circulation service, reference service, user service, library program service, space service, SNS service, organization and employees, device providing service, and next generation service. The results are summarized in Table I with codes assigned to more easily allow for the analysis of the tables and charts.

4. Result

The participants in this study totaled 52 libraries of which 19 were public libraries, 16 university libraries, and 17 special libraries that were registered in the National Library Statistics System; the collected indicators were in total 52 sets, with an 86.67 percent return rate. The evaluation was performed from August 18-31, 2015.

The libraries were evaluated on how much they were conventional or digital according to the elements, and 13 items such as acquisition, book collection, classification and cataloging, circulation service, and user service were assessed.

4.1 Evaluation for the digitization level in the elements of the libraries according to the library types

4.1.1 SNS service. The digitization level in the SNS service was evaluated on the aspect of the conventional library; it scored 95.00 for I4 (none) and 92.14 for I5 (direction service of library location using offline tools) in the public libraries, 90.53 for I6 (library service guide by website) and 89.47 for I5 (direction service of library location using offline tools) in the university libraries, and 92.67 for I9 (book searching service by the list) and 88.57 for I5 (direction service of library location using offline tools) in the

Table I.
Contents and classifications of the index for evaluating the level

Code	Conventional	Element of the library	Digital	Code
A1	Determining material (book, periodical, annual publication, yearbook, software, video, etc.) for purchasing offline (utilizing agency and booklet)	Acquisition	Determining material (book, periodical, annual publication, yearbook, software, video, etc.) for purchasing online (utilizing online catalogue etc.)	A21
A2	Requesting material offline		Requesting material online	A22
A3	Selecting material offline		Selecting material online	A23
A4	Purchasing material offline		Purchasing material online	A24
A5	Comprehensively acquiring material offline		Comprehensively acquiring material online	A25
B1	Paper book	Collection (physical online collection)	E-book	B21
B2	Printed journal		E-journal	B22
B3	Video tape		Digital video	B23
B4	Audio CD		Digital audio	B24
B5	Analog material		Multimedia material	B25
B6	Mostly providing purchased and physical contents		Providing open contents, open sources, and open applications	B26
B7	Manual and semiautomatic book collection management		RFID-based book collection management	B27
B8	Preserving offline material and involving in the copyright issues		Preserving digital material and involving in the copyright issues	B28
B9	Preserved book collection in the offline form		Preserved book collection in the digital form (archiving)	B29
C1	Creating original list	Classification and cataloging	Creating list by downloading	C21
C2	Providing the printed or the booklet list		Providing online list (including provision by mobile devices such as smartphone)	C22
C3	Providing the list with bibliographic information		Providing the list information online with index, abstract, and table of contents	C23
C4	Creating index by manual labor		Creating index by automatic index system	C24
C5	Creating abstract by manual labor		Creating abstract by automatic abstract system	C25
D1	Lending books offline and returning the books online (excluding smart device)	Circulation service	Circulation service with use of smart devices and social media	D21
D2	Circulation service of the individual library		Integrated circulation service system of libraries	D22
D3	Offline interlibrary loan service		Online interlibrary loan service	D23
D4	Reserving books offline		Reserving books online	D24
D5	Renewing books offline		Renewing books online	D25
D6	Book returning desk		Automatic book returning machine	D26
D7	Circulation service with use of 2D barcode		RFID-based circulation service	D27

(*continued*)

Code	Conventional	Element of the library	Digital	Code
E1	Offline reference service	Reference service	Virtual and online reference service (chat service in real time, bulletin board-based service, etc.)	E21
E2	Reference service for offline resources		Reference service for online resources	E22
E3	Offline book recommendation service		Online book recommendation service	E23
E4	Collaborative reference service		Collaborative Digital Reference Service (CDRS)	E24
E5	Offline outreach service		Digital (online) outreach service (reference-question service in utilization of such as video lecture system, online reading-books service for the elders and children, etc.)	E25
F1	Number of offline users	User service	Number of online users	F21
F2	Using offline material		Using online material	F22
F3	Using offline service		Using online service	F23
F4	No internet discussion forum		Bulletin board service such as internet discussion forum	F24
F5	No support for mobile service related to the library resources		Providing support for mobile service related to the library resources	F25
F6	One-way service		Interactive user-based service	F26
F7	Sending e-mail related to library events and services		Sending SMS related to library events and service	F27
F8	Duplication service for material		Support for publication. bookbinding services by digital publication tools and devices Example publication services for books or academic journals are provided by the public libraries and major university libraries in USA	F28
F9	No support for business service		Providing support for business service	F29
F10	Providing only the library-owned resources		Providing linkage service of content with external organizations	F30
F11	Providing education based on the offline material		Supporting digital learning center	F31
G1	Applying the library programs offline	Library program service	Applying the library programs online	G21
G2	Offline user education		Online user education	G22
G3	Offering culture program offline		Offering culture program online (online history experience program, online calligraphy program, etc.)	G23
G4	Offering offline reading program		Offering reading program online (online reading discussion, online guidance for reading and writing, etc.)	G24
G5	Offering the library programs offline		Providing video of the library programs in real time (providing webinar service)	G25
G6	Offering the programs only for members of the library		Offering the program open to the local community for participation	G26

(*continued*)

Table I.

Table I.

Code	Conventional	Element of the library	Digital	Code
H1	No multimedia room	Space service	Establishing lab (including multimedia room) equipped with high-tech devices such as laptop, iPad, 3D printer	H21
H2	No seats for using computer and laptop		Providing many seats for using computer and laptop	H22
H3	No wireless Wi-Fi		Providing wireless Wi-Fi	H23
H4	Providing offline meeting room		Providing meeting room available for video teleconference	H24
H5	Providing lecture room for seminar		Providing seminar room with large screen	H25
H6	No experience room for high-tech devices		Providing experience room for high-tech devices (experience space of the most recently launched devices) Example Google glass, Galaxy gear, etc.	H26
H7	Library promotion using poster and bulletin board		Library promotion in digital billboard	H27
H8	Establishing community center available for offline workshop		Establishing community center available for online workshop	H28
H9	Offline exhibition space		Online exhibition space	H29
H10	Offline reading and discussion space		Online reading and discussion space	H30
H11	Providing the world's best library service in physical form		Providing library service in the virtual world (providing service to experience the library in every corner without directly going to) Example museum view of the National Museum of Korea, etc.	H31
I1	Reference service for new books by pamphlets, etc.	SNS service	Reference service for new books by Facebook, etc.	I21
I2	Reference service in special subjects by booklets		Reference service in special subjects based on social tag/bookmark	I22
I3	Bibliographic information sharing service by comprehensive list system		Bibliographic information sharing service based on social tag/bookmark	I23
I4	None		Information service by Webzine (connecting to short bibliography and the original text)	I24
I5	Direction service of library location using offline tools		Direction service of library location using mash-up, etc.	I25
I6	Library service guide by website		Library service guide by Facebook, Twitter, etc.	I26
I7	Offline new arrival book service of academic resources		Social bookmark service of academic resources	I27
I8	Notification service for new material by sending e-mail		Notification service for new material by RSS, SNS, and SMS	I28
I9	Book searching service by the list		Book searching service by bookmarklets	I29
I10	Library guide service by brochure		Library guide service by Wiki, blog, Facebook, etc.	I30
I11	Offline promotion and event		Promotion and event using Twitter, Facebook, Microblog, etc.	I31
I12	Offline Q&A service		Q&A service using Twitter, Facebook, Kakao Talk, subject guide system, and e-mail	I32

(*continued*)

Table I.

Code	Conventional	Element of the library	Digital	Code
J1	Hierarchical organization	Organization and employees	Star organization	J21
J2	The librarian-centered		The user-centered	J22
J3	Based on personal performance		Based on collaborative performance	J23
J4	Performing works mostly by offline system		Performing works mostly by online system	J24
J5	Processing offline material		Digitization of material	J25
J6	Maladjustment of library's employees due to rapid informatization		Maladjustment of library's employees due to rapid increase of data volume	J26
J7	Social alienation due to refusing re-education		Learning by oneself to be socially integrated	J27
J8	Centralized authorities		Decentralized authorities	J28
J9	Offline workload		Online workload	J29
K1	No desktop and laptop computers, etc.	Device providing service	Providing desktop and laptop computers, iPad, e-book device, etc.	K21
K2	Scanner		3D scanner	K22
K3	2D printer		3D printer	K23
K4	Film camera		Digital camera	K24
L1	No support for cloud-based service	Next generation service	Cloud-based service (example of the cloud-based service) Cloud service for IT resources in the library Collaborative preserving and sharing services of the library's data (collaborative cloud repository) Social network service based on cloud computing Cloud collection service Integrated service of electronic contents based on the cloud Integrated service of the library's academic resources based on the cloud Volunteer service for special subjects in the library based on the cloud	L21
L2	No support for space service of infinite creation		Space service of infinite creation Offering Infinite-imagination program Space service for creative production utilizing 3D printer Space service for realizing business ideas Book publication service, etc.	L22

(*continued*)

Table I.

Code	Conventional	Element of the library	Digital	Code
			[a]The space of infinite creation physically demolishes all barriers between local community and the global, academic society and practical reality, writers and readers, producers and users, professors and students, employers and employees, creators and consumers, etc. to be social communication space	
L3	No support for big data-based service		Big data-based service (example of the big data-based service) User-centered service based on big data Book recommendation service based on big data Customized user education service based on big data Analysis service for information source network based on big data Analysis service for utilization pattern based on big data Book collection development service based on big data	L23
L4	No support for utilizing Google glass		Service for utilizing Google glass (example of the service by utilizing Google glass) Voice directions service for the disabled Reading-books service Language translation service	L24
L5	No support for augmented reality-based service		Augmented reality-based service (example of the augmented reality-based service) Guide service for location of books in the application of the augmented reality Providing book information service by applying the augmented reality in real books Providing evaluation service for books by applying the augmented reality in real books Providing information service of the library building in application of the augmented reality Providing information service of the inside of library in application of the augmented reality Providing reading support in application of the augmented reality Providing education support in application of the augmented reality	L25

(*continued*)

Code	Conventional	Element of the library	Digital	Code
L6	No support for situation recognition technology-based service		Situation recognition technology-based service (example of the situation recognition technology-based service) Reference service in the application of the situation recognition technology Lending books service in the application of the situation recognition technology Recognition service for user's behavior, moving route, and temperature Recognition service for users in a state of emergency	L26
L7	No support for library service by using QR code		Library service by using QR Code (example of the library service by using QR Code) Guide service of books by using QR Code Tour service of the library by using QR Code Reservation service for group study room by using QR Code Connection service automatically to the website by using QR Code Location information service for the collections by using QR Code Connection service to book reviews by using QR Code Searching service of the collections by using QR Code	L27
L8	No support for semantic web-based service		Semantic web-based service (example of the semantic web-based service) Searching service by combining semantic matching Linked open data (LOD): connection service to the resources of the world's library RDF expression of the list and bibliographic information Establishing the ontology of the library's information resources	L28
M1	This library has more conventional characteristics	Our library is	This library has more digital characteristics	M21
M2	This library has stronger physical attributes		This library has stronger digital and virtual attributes	M22
M3	This library is ownership-centered		This library is approach-centered	M23
M4	The users of the library are consumption oriented		The users of the library are production oriented	M24
M5	This library is collection-centered		This library is data-centered	M25
M6	This library is librarian-centered		This library is user-centered	M26
M7	This library is facility-centered		This library is service-centered	M27
M8	This library is archive-centered		This library is portal-centered	M28
M9	This is the conventional library		This is the digital library	M29

Table I.

special libraries. With respect to the digital library, the scores were: 52.86 for I28 (alarming service for new material by RSS, SNS, and SMS) and 26.25 for I30 (library guide service by Wiki, blog, Facebook, etc.) in the public libraries; 46.67 for I28 (notification service for new material by RSS, SNS, and SMS) and 27.63 for I32 (Q&A service using Twitter, Facebook, Kakao Talk, subject guide system, and e-mail) in the university libraries; and 22.86 for I28 (notification service for new material by RSS, SNS, and SMS) and 19.23 for I27 (social bookmark service of academic resources) in the special libraries.

The SNS service fit the conventional element for all the types of libraries with average scores of 81.81 for the special libraries, 78.55 for the university libraries, and 77.87 for the public libraries. Both the rate of providing library services utilizing the SNS service and the element of next generation service scored significantly low registering 17.08 and 7.09, respectively. While all the types of libraries scored low for the digital elements, the special libraries were particularly low on this element (Table II and Figures 2-5).

4.1.2 Organization and employees. The digitization level in the organization and employees of a library was evaluated on the aspect of the conventional library; the scores were 79.06 for J1 (hierarchical organization) and 55.63 for J9 (offline workload) in the public libraries, 91.05 for J1 (hierarchical organization) and 51.58 for J5 (processing offline material) in the university libraries, and 70.63 for J1 (hierarchical organization) and 57.81 for J9 (offline workload) in the special libraries. With respect to the digital library, the scores were: 79.38 for J27 (learning by oneself to be socially integrated) and 68.13 for J23 (based on collaborative performance) in the public libraries; 77.89 for J27 (learning by oneself to be socially integrated) and 69.47 for J22 (the user-centered) in the university libraries; and 85.38 for J27 (learning by oneself to be socially integrated) and 73.44 for J22 (the user-centered) in the special libraries.

In evaluating whether the organization and employees of a library fit the digital element, the averages were scored as 55.77 for the public library, 53.76 for the university libraries, and 52.56 for the special libraries. On the aspect of the conventional library, the averages were scored as 46.24 for the university libraries, 45.53 for the special libraries, and 44.16 for the public library.

Accordingly, along this aspect both categories apply. The organization and employees of the library showed slightly more digital characteristics; the item of learning by oneself to be socially integrated scored significantly high with 80.88 (Table III and Figures 6-9).

4.1.3 Device providing service. When the digitization level in the device providing service was evaluated on the aspect of the conventional library, it scored 100.00 for K2 (scanner) and 96.88 for K3 (2D printer) in the public libraries; 95.26 for K2 (scanner) and 87.37 for K3 (2D printer) in the university libraries; and 92.67 for both K2 (scanner) and K3 (2D printer) and 18.75 for K4 (film camera) in the special libraries. On the aspect of the digital library, the scores were 93.33 for K24 (digital camera) and 85.94 for K21 (providing desktop and laptop computers, iPad, e-book device, etc.) in the public libraries; 89.38 for K21 (providing desktop and laptop computers, iPad, e-book device, etc.) and 68.75 for K24 (digital camera) in the university libraries; and 86.25 for K21 (providing desktop and laptop computers, iPad, e-book device, etc.) and 78.57 for K24 (digital camera) in the special libraries.

In evaluating that the device providing service fit the conventional element, the averages were scored as 54.40 for the public library, 53.36 for the special libraries, and 51.24 for the university libraries. On the aspect of the digital library, the averages were scored as

Code	Public		Conventional Academic		Special		Element of the library	Public		Digital Academic		Special		Code
	Sum	Mean	Sum	Mean	Sum	Mean		Sum	Mean	Sum	Mean	Sum	Mean	
I1	1,290	86.00	1,280	75.29	990	82.50	SNS service	210	14.00	420	24.71	110	7.86	I21
I2	1,150	82.14	1,230	72.35	1,060	81.54		160	11.43	370	21.76	140	11.67	I22
I3	1,370	91.33	1,470	86.47	1,310	87.33		130	8.67	230	13.53	90	6.43	I23
I4	1,520	95.00	1,480	77.89	1,240	77.50		80	5.00	420	22.11	170	11.33	I24
I5	1,290	92.14	1,700	89.47	1,240	88.57		110	7.86	200	10.53	60	4.62	I25
I6	1,165	72.81	1,720	90.53	1,280	85.33		390	24.38	180	9.47	120	8.57	I26
I7	1,100	68.75	1,530	80.53	1,130	80.71		100	6.25	370	19.47	250	19.23	I27
I8	560	40.00	960	53.33	1,080	72.00		740	52.86	840	46.67	320	22.86	I28
I9	1,290	80.63	1,480	82.22	1,390	92.67		310	19.38	330	18.33	10	0.71	I29
I10	1,180	73.75	1,630	85.79	1,040	80.00		420	26.25	270	14.21	160	13.33	I30
I11	1,185	74.06	1,450	76.32	1,190	77.86		415	25.94	450	23.68	210	15.00	I31
I12	1,245	77.81	1,375	72.37	1,160	75.71		355	22.19	525	27.63	240	17.14	I32
Total	14,345	77.87	17,305	78.55	14,110	81.81		3,420	18.68	4,605	21.01	1,880	11.56	Total

Table II.
Evaluation for the digitization level in the SNS service of the libraries according to the library types

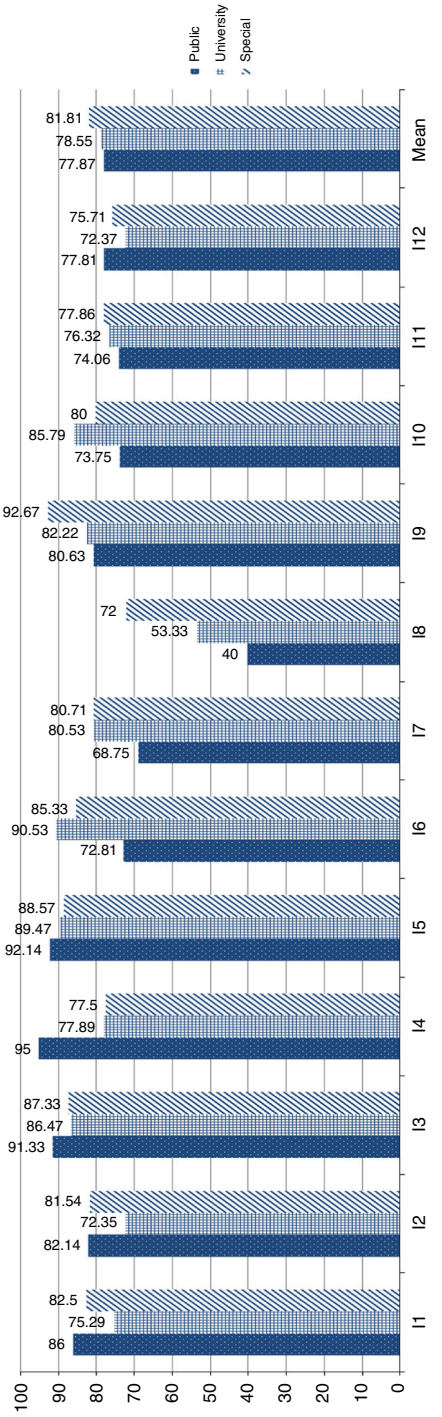

Figure 2.
Evaluation for the conventional elements in the SNS service of the libraries

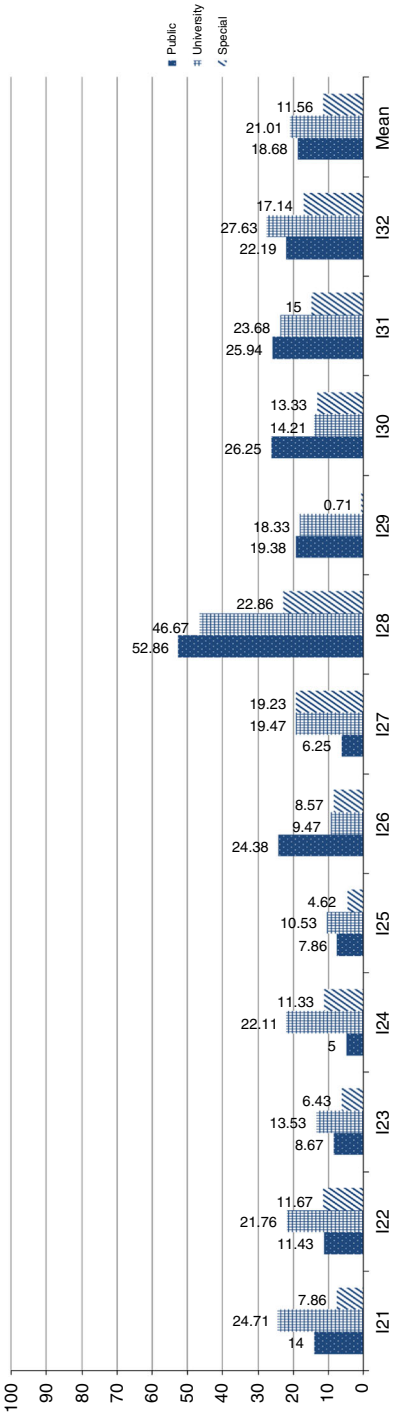

Figure 3.
Evaluation for the digital elements in the SNS service of the libraries

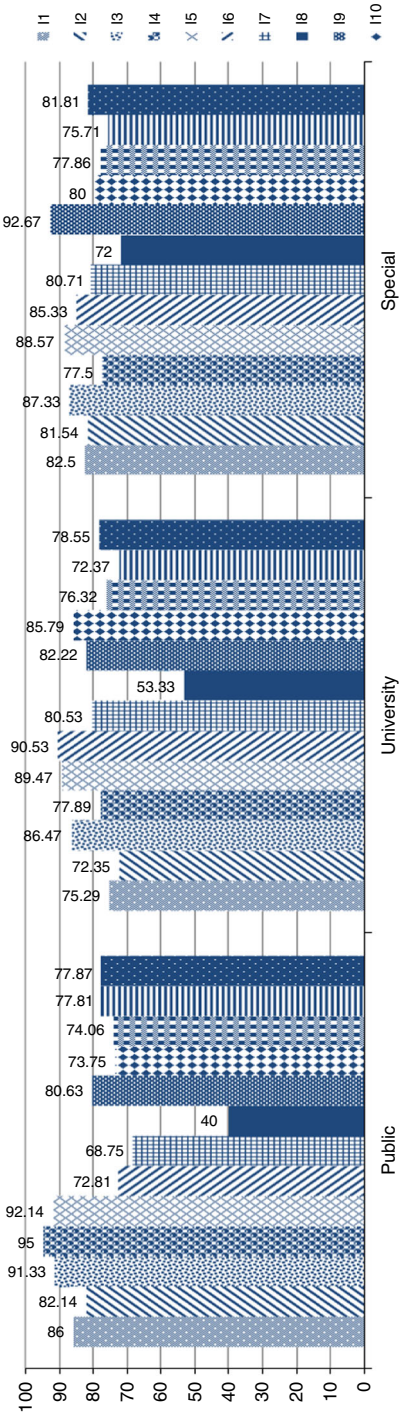

Figure 4.
Evaluation for the conventional elements in the SNS service of the libraries according to the library types

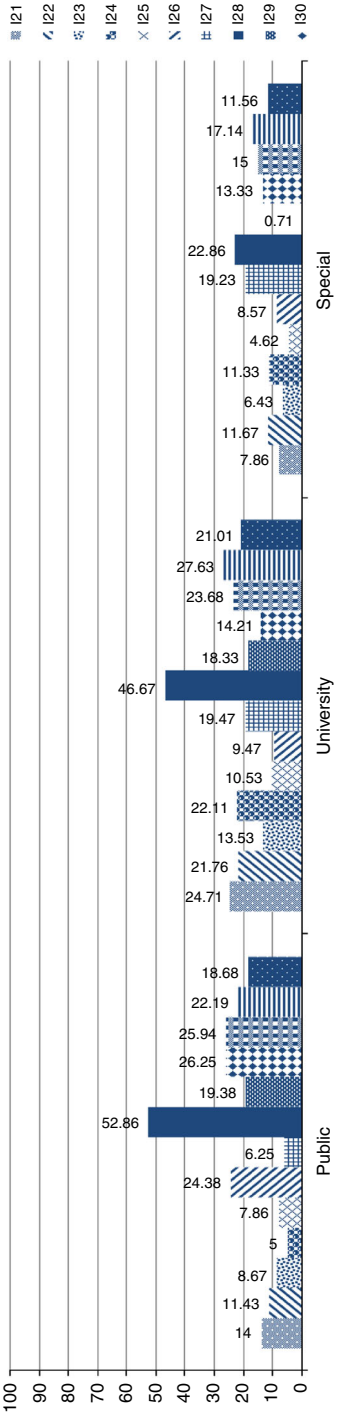

Figure 5.
Evaluation for the digital elements in the SNS service of the libraries according to the library types

Table III.
Evaluation for the digitization level in the organization and employees of the libraries according to the library types

	Conventional							Digital						
	Public		Academic		Special			Public		Academic		Special		
Code	Sum	Mean	Sum	Mean	Sum	Mean	Element of the library	Sum	Mean	Sum	Mean	Sum	Mean	Code
J1	1,265	79.06	1,730	91.05	1,130	70.63	Organization and employees	335	20.94	170	8.95	370	24.67	J21
J2	520	32.50	580	30.53	425	26.56		1,080	67.50	1,320	69.47	1,175	73.44	J22
J3	510	31.88	750	39.47	820	51.25		1,090	68.13	1,150	60.53	680	45.33	J23
J4	760	47.50	700	36.84	835	52.19		840	52.50	1,200	63.16	765	47.81	J24
J5	720	45.00	980	51.58	910	56.88		820	51.25	920	48.42	690	46.00	J25
J6	730	48.67	820	48.24	520	37.14		770	51.33	880	51.76	780	60.00	J26
J7	330	20.63	420	22.11	190	13.57		1,270	79.38	1,480	77.89	1,110	85.38	J27
J8	585	36.56	920	51.11	700	43.75		1,065	66.56	880	48.89	740	49.33	J28
J9	890	55.63	860	45.26	925	57.81		710	44.38	1,040	54.74	657	41.06	J29
Total	6,310	44.16	7,760	46.24	6,455	45.53		7,980	55.77	9,040	53.76	6,967	52.56	Total

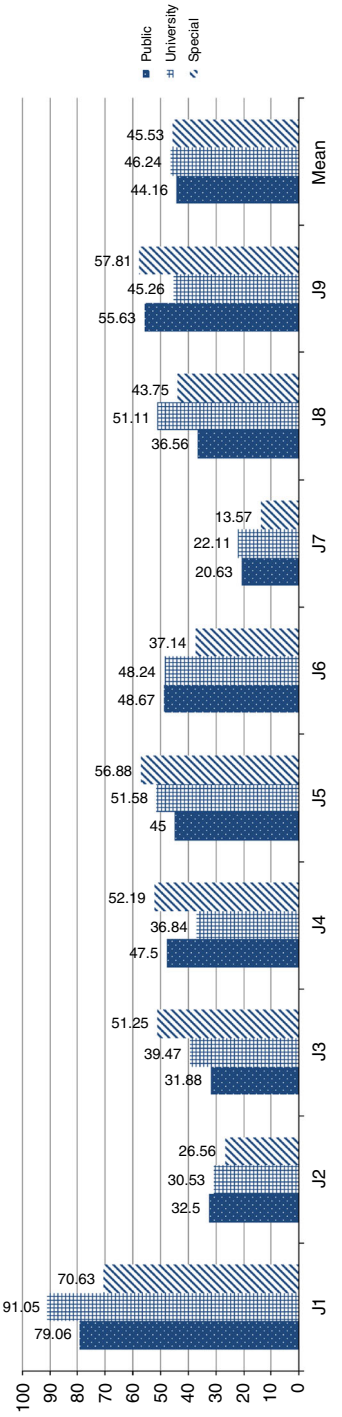

Figure 6.
Evaluation for the conventional elements in the organization and employees of the libraries

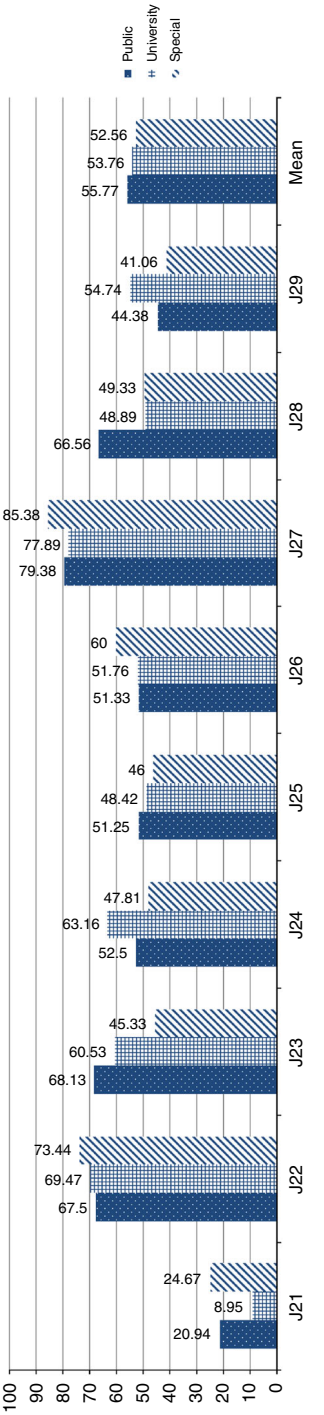

Figure 7.
Evaluation for the digital elements in the organization and employees of the libraries

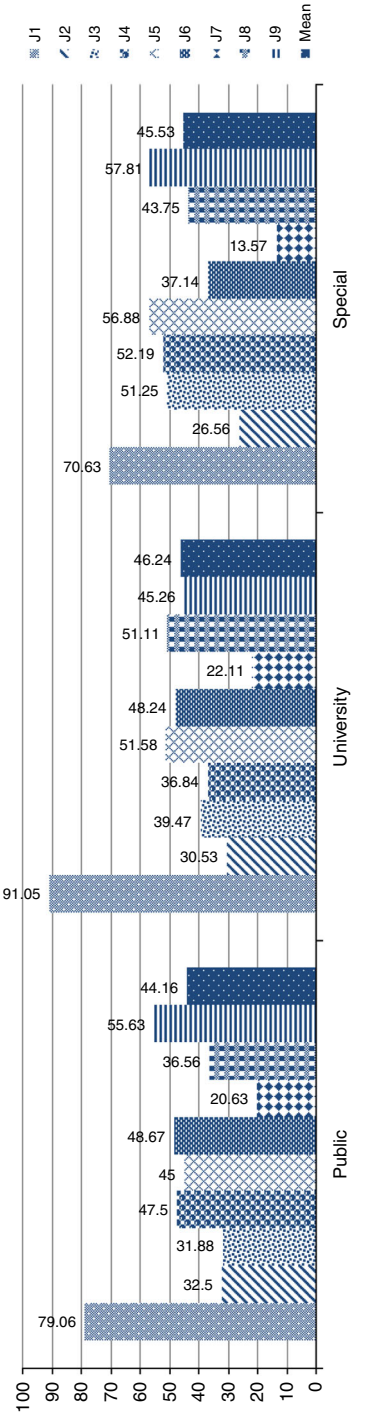

Figure 8.
Evaluation for the conventional elements in the organization and employees of the libraries according to the library types

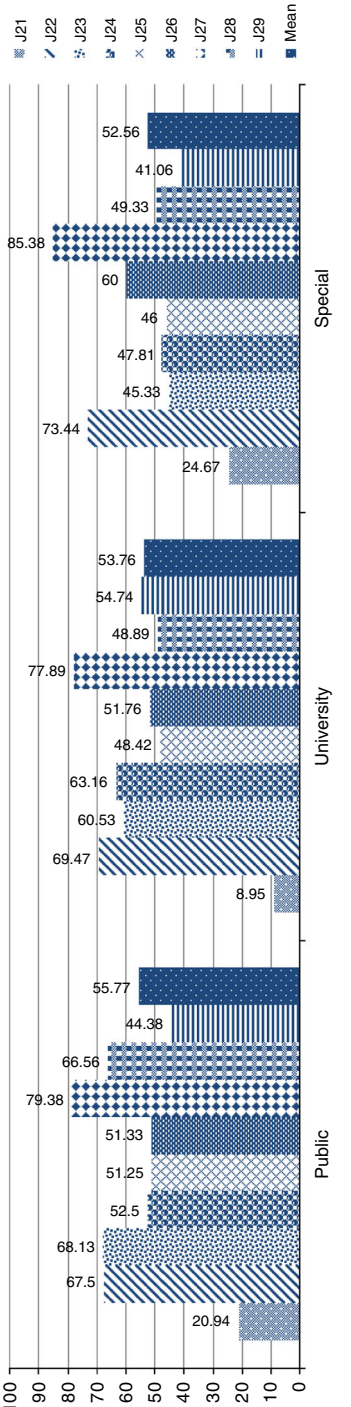

Figure 9.
Evaluation for the digital elements in the organization and employees of the libraries according to the library type

45.60 for the public library, 41.56 for the special libraries, and 41.09 for the university libraries. Accordingly, the averages for the element of the device providing service were similar to both the conventional and digital models (Table IV and Figures 10-13).

4.1.4 Next generation service. The digitization level in the next generation service was evaluated on the aspect of the conventional library. The scores were: 100.00 for L1 (no support for cloud-based service), L5 (no support for augmented reality-based service), and L6 (no support for situation recognition technology-based service), 99.38 for L8 (no support for semantic web-based service), 95.00 for L4 (no support for utilizing Google glass) in the public libraries; 90.53 for L5 (no support for augmented reality-based service) and L6 (no support for situation recognition technology-based service) and 88.95 for L2 (no support for space service of infinite creation) in the university libraries; and 93.75 for L6 (no support for situation recognition technology-based service) and 93.13 for each of L1 (no support for cloud-based service), L4 (no support for utilizing Google glass), and L5 (no support for augmented reality-based service) in the special libraries. With respect to the digital library, the scores were: 18.75 for L22 (space service of infinite creation) and 6.25 for L23 (big data-based service) in the public libraries; 28.42 for L21 (cloud-based service) and 17.37 for L28 (semantic web-based service) in the university libraries; and 8.00 for L27 (library service by using QR Code) and 6.00 for L28 (semantic web-based service). The public libraries scored 0.00 for each of L21 (cloud-based service), L25 (augmented reality-based service), and L26 (situation recognition technology-based service), implying that they rarely provided those services; while, the special libraries scored 0.00 for L26 (situation recognition technology-based service), implying that they did not provide the service.

In evaluating that the next generation service fit the conventional element, the average scores were 96.02 for the public library, 91.09 for the special libraries, and 85.56 for the university libraries, putting all the libraries in that category (Table V and Figures 14-17).

4.1.5 Our library is. The digitalization level of the libraries was comprehensively evaluated on the aspect of the conventional library; its scores were 86.00 for M1 (this library has more conventional characteristics) and 85.31 for M2 (this library has stronger physical attributes) in the public libraries; 65.26 for M5 (this library is collection-centered) and 65.00 for M2 (this library has stronger physical attributes) in the university libraries; and 76.56 for M2 (this library has stronger physical attributes) and 74.00 for M9 (this is the conventional library) in the special libraries. With respect to the digital library, the scores were 78.75 for M26 (this library is user-centered) and 65.63 for M27 (this library is service-centered) in the public libraries; 65.79 for M26 (this library is user-centered) and 56.32 for M27 (this library is service-centered) in the university libraries; and 68.44 for M27 (this library is service-centered) and 66.56 for M26 (this library is user-centered) in the special libraries.

For the conventional aspect the libraries scored 64.11 for the public libraries, 55.35 for the university libraries, and 59.72 for the special libraries, and for the digital aspect, 36.16 for the public libraries, 44.53 for the university libraries, and 39.86 for the special libraries. An insignificant difference was found between the level of digitization in the university libraries and the conventional model so they were found to fit both categories. The other two types of libraries more clearly came out to be conventional.

Thus, in evaluating whether our library was overall digital or conventional, many evaluators concluded their libraries to be more conventional; the average score was 59.73 for being conventional and 40.18 for being digital (Table VI and Figures 18-21).

Table IV.
Evaluation for the digitization level in the device providing service of the libraries according to the library types

Conventional							Digital						
	Public		Academic		Special			Public		Academic		Special		
Code	Sum	Mean	Sum	Mean	Sum	Mean	Element of the library	Sum	Mean	Sum	Mean	Sum	Mean	Code
K1	225	14.06	270	14.21	150	9.38	Device providing Service	1,375	85.94	1,530	89.38	1,380	86.25	K21
K2	1,600	100.00	1,810	95.26	1,390	92.67		0	0.00	0	0.00	10	0.71	K22
K3	1,550	96.88	1,660	87.37	1,390	92.67		50	3.13	100	6.25	10	0.71	K23
K4	100	6.67	130	8.13	150	18.75		1,400	93.33	1,200	68.75	550	78.57	K24
Total	3,475	54.40	3,870	51.24	3,080	53.36		2,825	45.60	3,330	41.09	1,950	41.56	Total

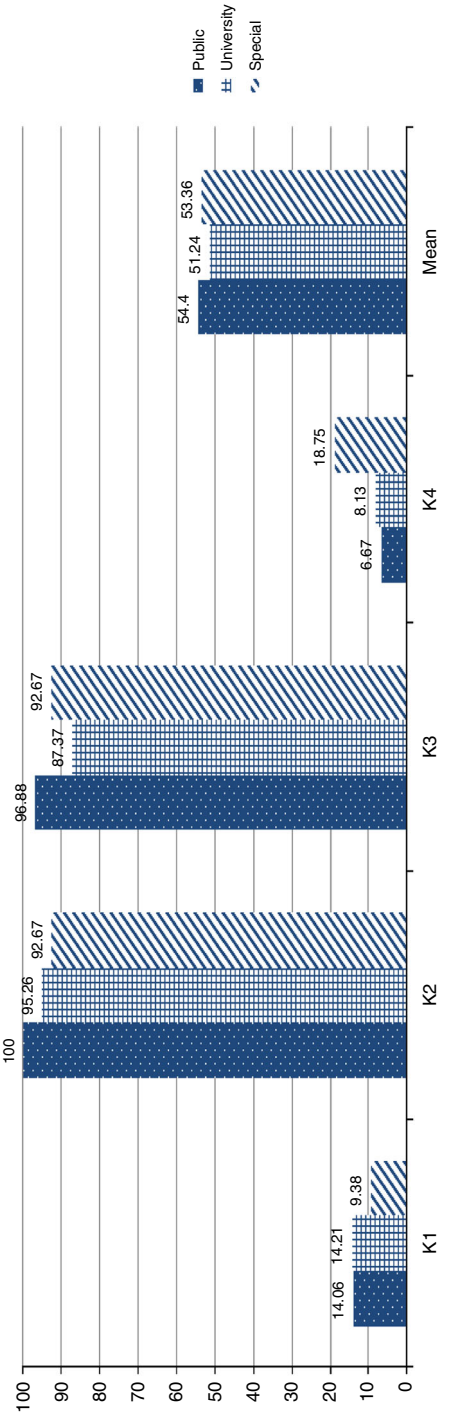

Figure 10.
Evaluation for the conventional elements in the device providing service in the libraries

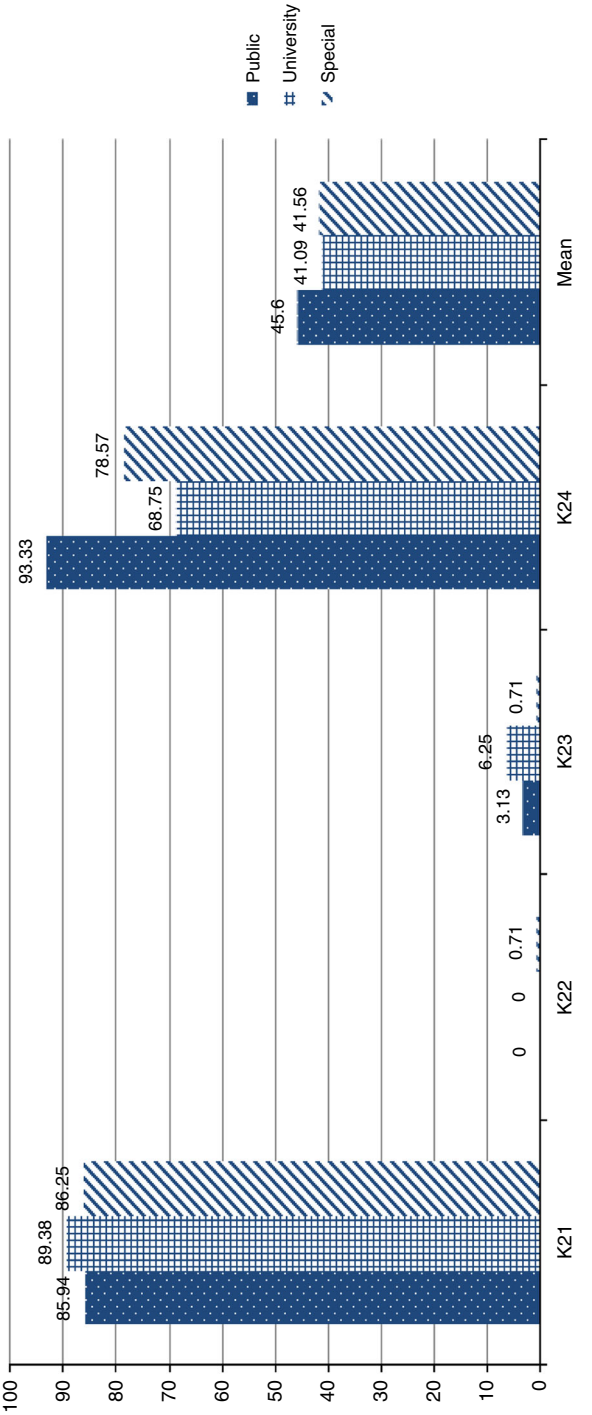

Figure 11.
Evaluation for the digital elements in the device providing service in the libraries

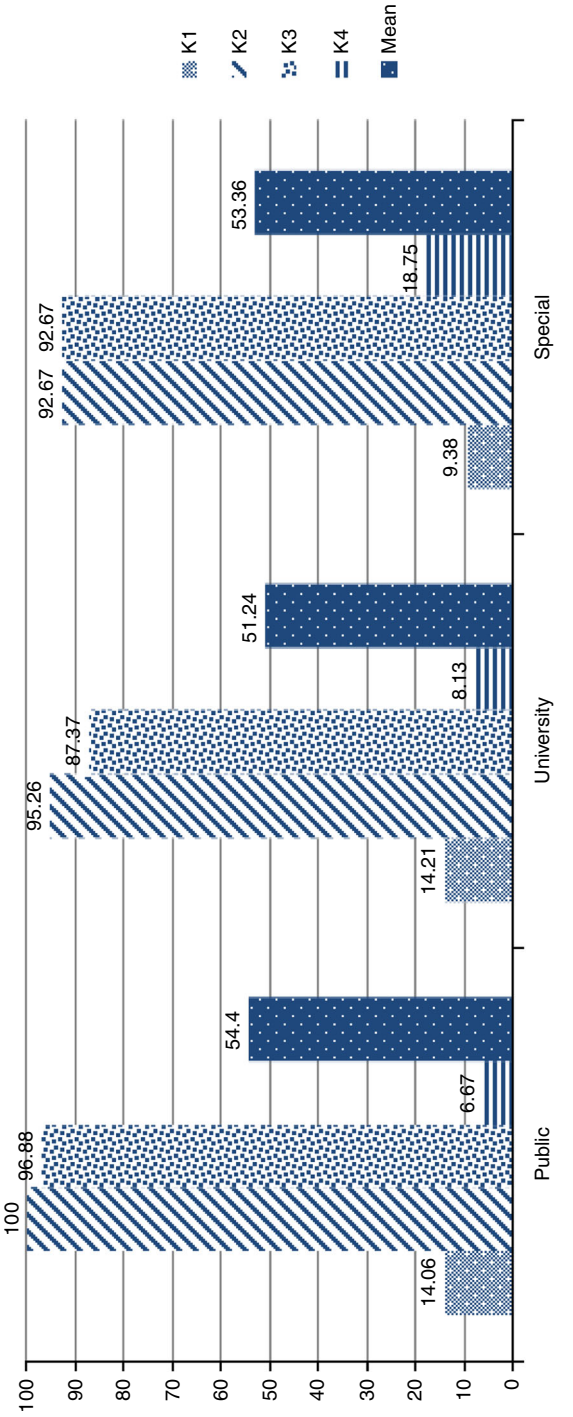

Figure 12.
Evaluation for the conventional elements in the device providing service in the libraries according to the library types

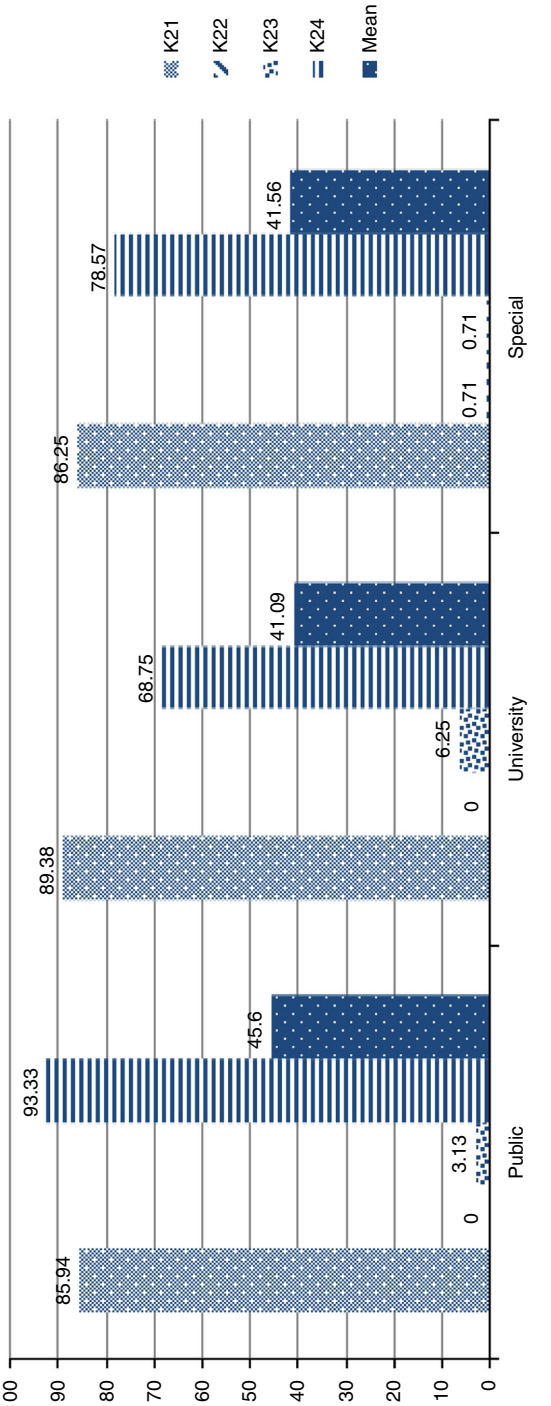

Figure 13.
Evaluation for the digital elements in the device providing service in the libraries according to the library types

Code	Public		Conventional Academic		Special		Element of the library	Public		Digital Academic		Special		Code
	Sum	Mean	Sum	Mean	Sum	Mean		Sum	Mean	Sum	Mean	Sum	Mean	
L1	1,600	100.00	1,360	71.58	1,490	93.13	Next generation service	0	0.00	540	28.42	10	0.67	L21
L2	1,300	81.25	1,690	88.95	1,480	92.50		300	18.75	210	11.05	20	1.33	L22
L3	1,500	93.75	1,590	83.68	1,420	88.75		100	6.25	310	16.32	80	5.33	L23
L4	1,520	95.00	1,700	89.47	1,490	93.13		80	5.00	200	10.53	10	0.67	L24
L5	1,600	100.00	1,720	90.53	1,490	93.13		0	0.00	180	9.47	10	0.67	L25
L6	1,600	100.00	1,720	90.53	1,500	93.75		0	0.00	180	9.47	0	0.00	L26
L7	1,580	98.75	1,655	87.11	1,380	86.25		20	1.25	245	12.89	120	8.00	L27
L8	1,590	99.38	1,570	82.63	1,410	88.13		10	0.63	330	17.37	90	6.00	L28
Total	12,290	96.02	13,005	85.56	11,660	91.09		510	3.98	2,195	14.44	340	2.83	Total

Table V.
Evaluation for the digitization level in the next generation service of the libraries according to the library types

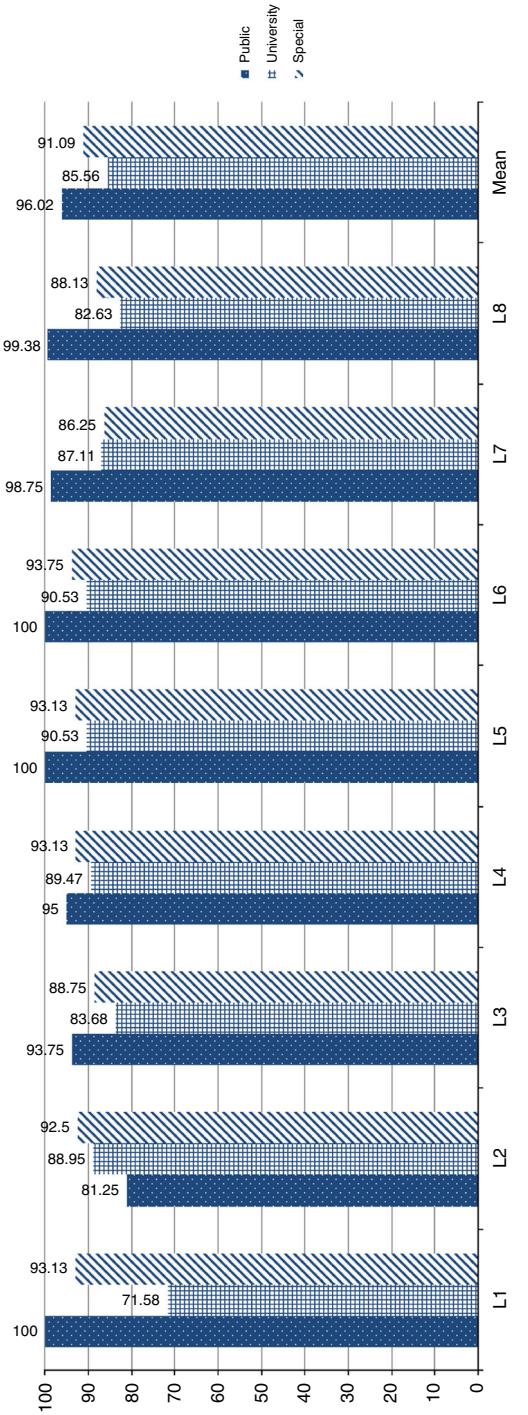

Figure 14.
Evaluation for the conventional elements in the next generation service of the libraries

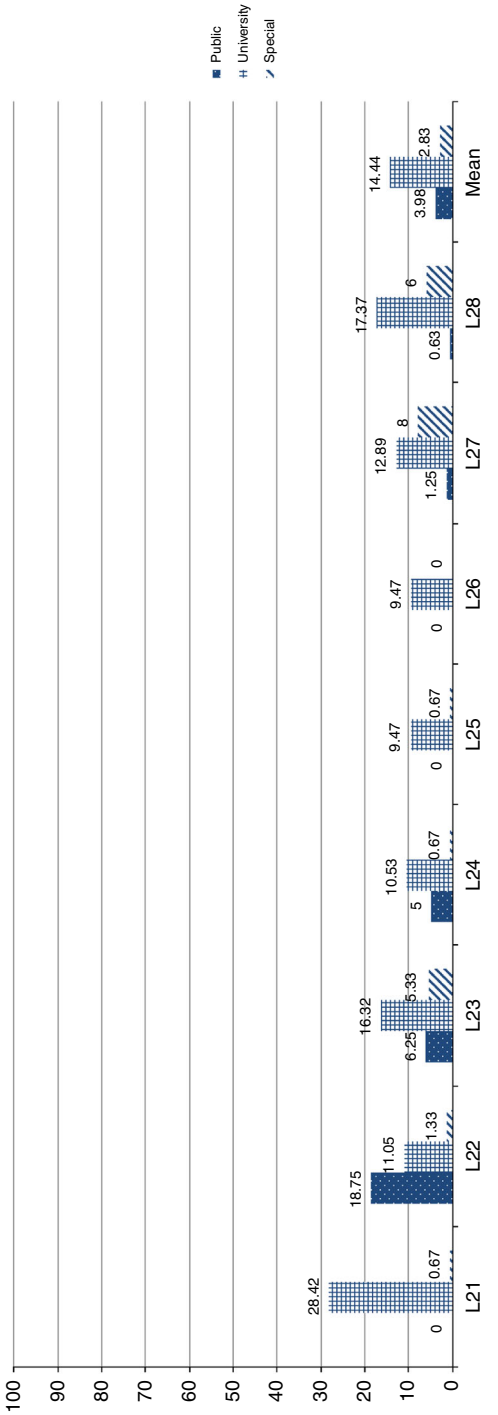

Figure 15.
Evaluation for the digital elements in the next generation service of the libraries

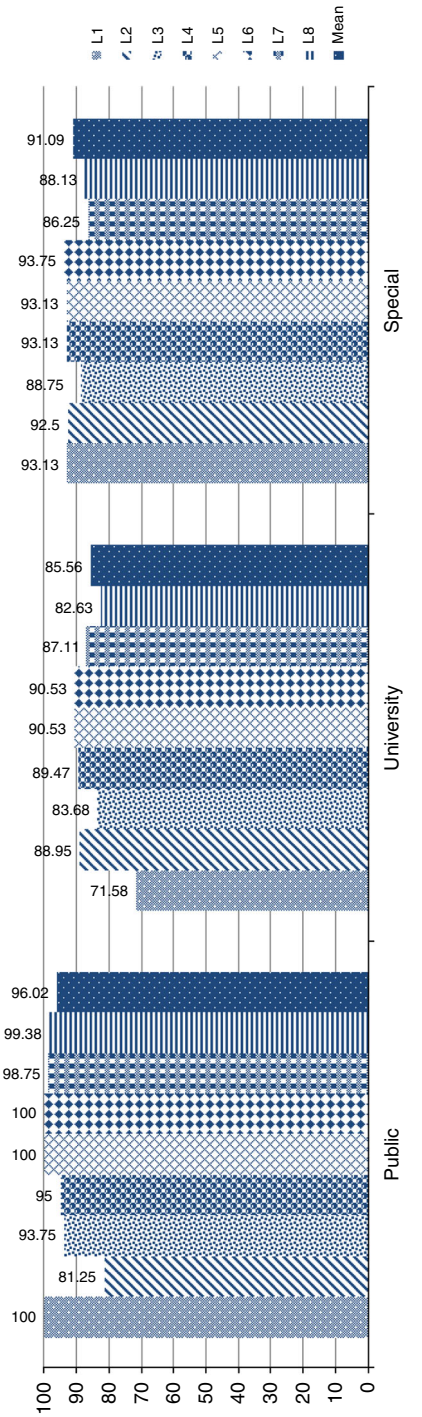

Figure 16.
Evaluation for the conventional elements in the next generation service of the libraries according to the library types

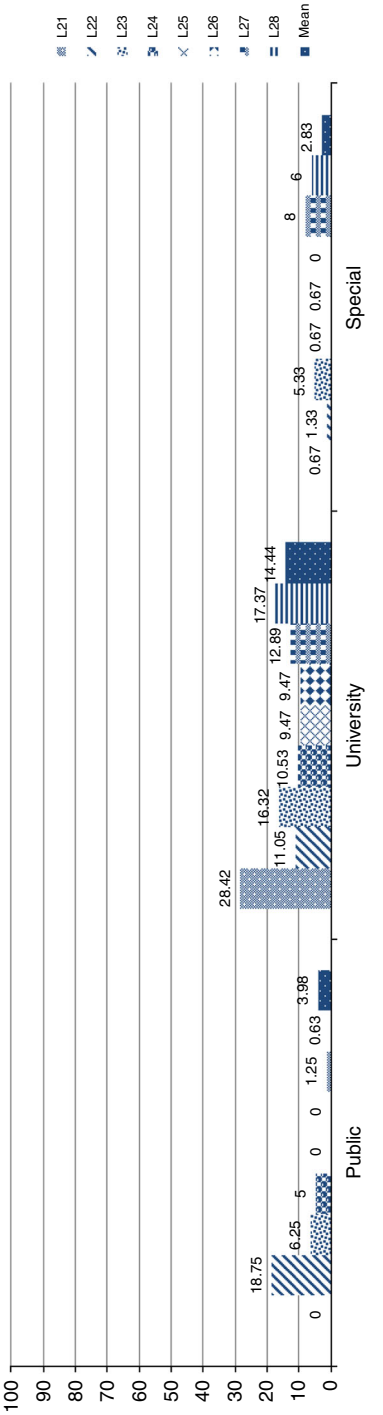

Figure 17.
Evaluation for the digital elements in the next generation service of the libraries according to the library types

Table VI.
Evaluation for the digitization level of the libraries according to the library types

	Conventional							Digital						
	Public		Academic		Special			Public		Academic		Special		
Code	Sum	Mean	Sum	Mean	Sum	Mean	Element of the library	Sum	Mean	Sum	Mean	Sum	Mean	Code
M1	1,370	86.00	1,160	61.05	1,165	72.81	Our library is?	230	14.38	740	38.95	435	27.19	M21
M2	1,365	85.31	1,235	65.00	1,225	76.56		225	14.06	665	35.00	375	23.44	M22
M3	930	58.13	1,100	57.89	1,110	69.38		670	41.88	800	42.11	500	31.25	M23
M4	1,090	68.13	1,150	60.53	830	51.88		510	31.88	750	39.47	770	48.13	M24
M5	1,360	85.00	1,240	65.26	1,065	66.56		240	15.00	640	33.68	535	33.44	M25
M6	340	21.25	650	34.21	535	33.44		1,260	78.75	1,250	65.79	1,065	66.56	M26
M7	550	34.38	830	43.68	505	31.56		1,050	65.63	1,070	56.32	1,095	68.44	M27
M8	840	56.00	925	48.68	920	61.33		710	47.33	975	51.32	480	34.29	M28
M9	1,325	82.81	1,175	61.84	1,110	74.00		265	16.56	725	38.16	390	26.00	M29
Total	9,170	64.11	9,465	55.35	8,465	59.72		5,160	36.16	7,615	44.53	5,645	39.86	Total

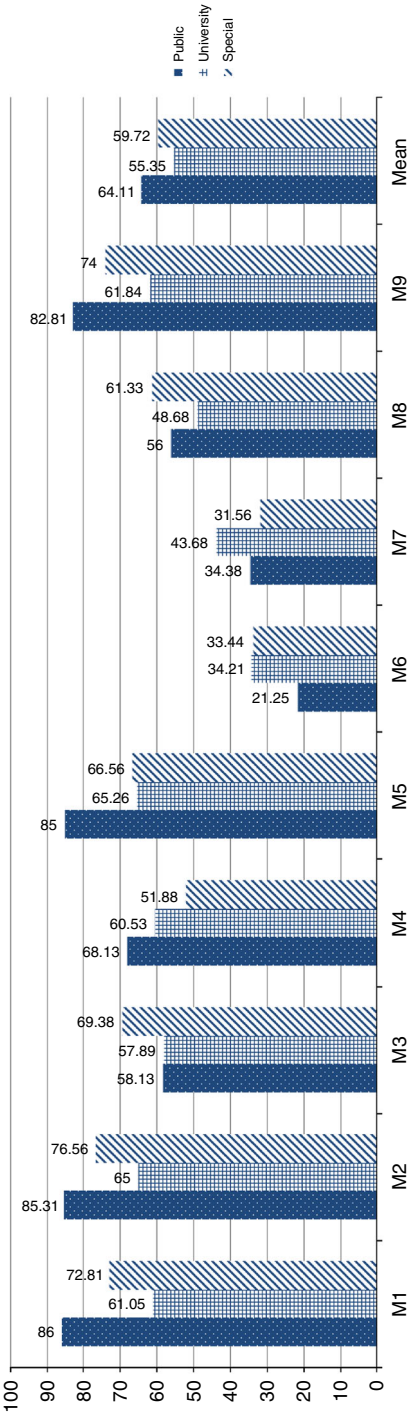

Figure 18.
Evaluation for the conventional elements in all aspects of the libraries

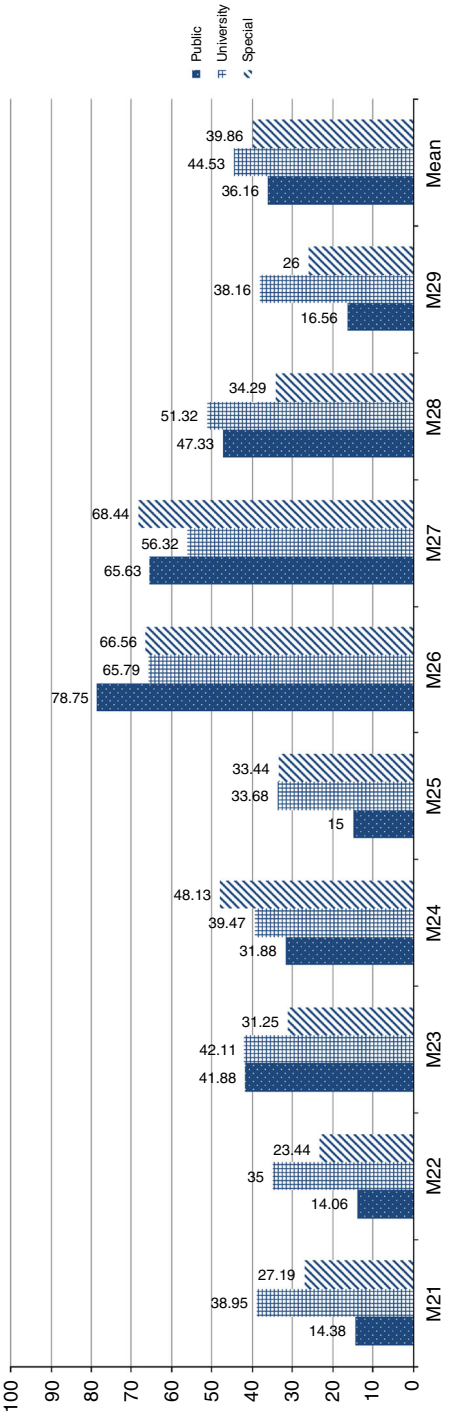

Figure 19.
Evaluation for the digital elements in all aspects of the libraries

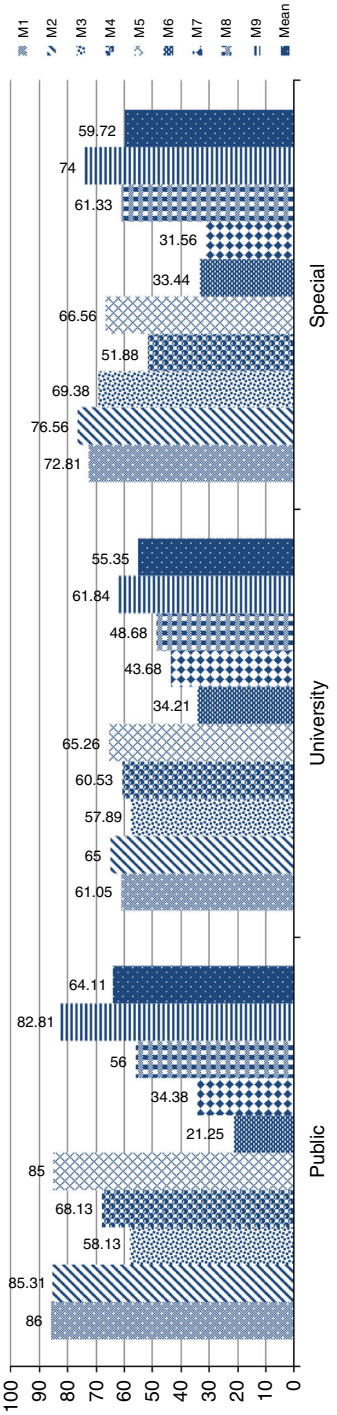

Figure 20.
Evaluation for the conventional elements in all aspects of the libraries according to the library types

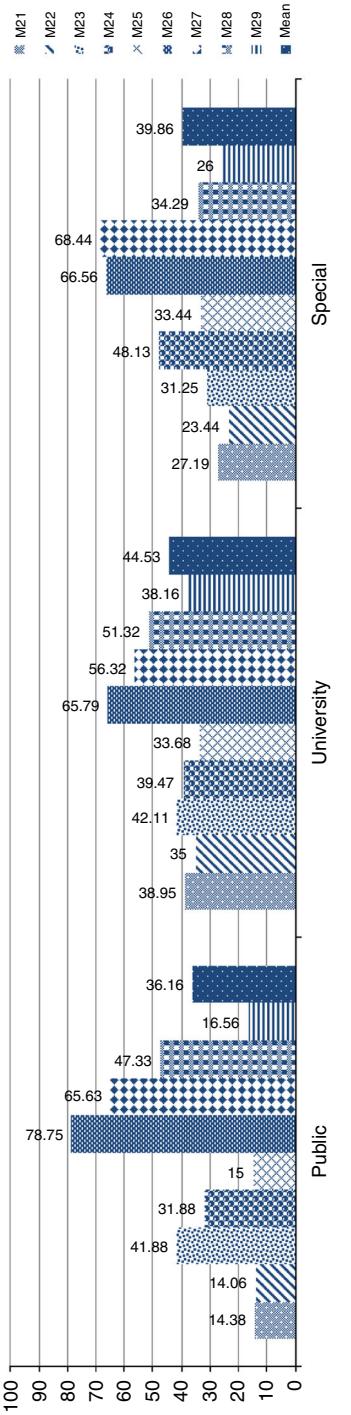

Figure 21.
Evaluation for the digital elements in all aspects of the libraries according to the library types

4.2 Evaluation of the digitization level according to items in the elements of library

The digitization level according to the items in the elements of library was assessed by evaluators who belonged to the library. First of all, the element of acquisition scored 75.13 for selecting material online (A23), 69.31 for requesting material online (A22), and 68.88 for comprehensively acquiring material online (A25). As the average of the acquisition on the aspect of digital function was 67.25, it was determined to be more digitized.

The element of book collection scored 83.19 for paper books (B1) and 80.75 for a preserved book collection in the offline form (B9) and it scored 63.05 for digital video (B23), 45.48 for digital audio (B24), and 40.22 for e-journal (B22). Since the average of the book collection with respect to the conventional function was 64.00, it was determined to still be conventional.

The element of classification and cataloging scored 85.42 for providing online lists (C22) and 72.33 for creating indexes by an automatic indexing system (C24). As the average of the classification and cataloging on the aspect of the digital function was 70.66, it was determined to be more digitized.

The element of circulation service scored 92.64 for lending books offline and returning the books online (D1) and 81.39 for a book returning desk (D6) and it scored 73.29 for reserving books online (D24), 64.37 for online interlibrary loan service (D23), and 63.17 for renewing books online (D25). As the average of the circulation service on the aspect of the conventional function was 54.72, and 43.60 with respect to the digital function it implied that it was digitized to a similar level.

The element of reference service scored 83.52 for offline outreach service (E5) and 74.21 for offline reference service (E1). As the average of the reference service on the aspect of the conventional function was 65.64, it implied that it was still conventional. The conventional items of the reference service obtained generally high scores; the scores for offline/online book recommendation services (E3 and E23) were 45.14 on the aspect of the conventional function and 53.90 with respect to the digital function, implying that the book recommendation service was digitized.

The element of user services scored 94.99 for duplication service for material (F8), 82.37 for no support for business service (F9), and 74.34 for providing education based on the offline material (F11); it scored 65.90 on the aspect of the conventional function, implying that it was conventional.

The element of library program services scored 89.43 for offering cultural programming offline (G3), 88.57 for offering the library programs offline (G5), and 86.34 for offering offline reading programs (G4); it scored 77.38 on the aspect of conventional function and 20.89 for the digital function, and thus it was determined to be conventional.

As the element of the service space scored 92.69 for no experience room for high-tech devices (H6), 92.47 for library promotion using poster and bulletin board (H7), 89.84 for providing the world's best library service in physical form (H11), and 89.43 for providing an offline meeting room (H4), it was overall determined to be conventional; meanwhile, the averages were significantly high to be considered digitized with scores of 86.80 for providing wireless Wi-Fi (H23) and 73.48 for providing many seats for using computers and laptops (H22). The service space area was deemed to be more conventional than digital with a 69.44 average score for the former and 27.05 score for the latter.

The element of SNS service scored 90.06 for direction services to the location of the library using offline tools (I5), 88.38 for bibliographic information sharing the service of a comprehensive list system (I3), and 85.17 for book searching services using the list (I9). As the averages were 79.41 to be conventional and 17.08 to be digital, it was determined still to be conventional.

The element of organization and employees scored 80.25 for hierarchical organization (J1) and 52.90 for offline workload (J9). It also scored 80.88 for learning by oneself to be socially integrated (J27) and 70.14 for being user-centered (J22). The averages in the organization and employees in the library scored 45.31 as to being conventional and 54.03 with respect to being digital, implying that the levels of digitization of the organization and employees were similar.

The averages in device providing service were pretty similar with a score of 53.00 for conventional and 44.79 for the digital aspect, putting them in both categories. Scores of 95.98 for scanner (K2), 92.30 for printer (K3), 85.99 for providing desktop and laptop computers, iPad, e-book device, etc. (K21) and 85.84 for digital camera (K24), with respect to providing the devices, clearly placed them in the digital category.

The element of next generation service produced scores of 94.76 for no support for situation recognition technology-based service (L6), 94.55 for no support for augmented reality-based service (L5), and 92.53 for no support for utilizing Google glass (L4), with the average in all of the conventional items scoring higher than 85.00. As the next generation service was evaluated as 90.89 to be conventional and 7.09 to be digital, the libraries tended rarely to provide the next generation services such as cloud, situation recognition service, and semantic web.

The libraries as a whole scored 75.63 for indicating that the library had stronger physical attributes (M2), 73.29 for indicating that the library had more conventional characteristics (M1), 72.88 for indicating that it is a conventional library (M9), and 72.28 for indicating that the library is collection-centered (M5). A score of 59.73 would be considered to be conventional and 40.18 to be digital, so the performances and services in the libraries were still determined to be conventional (Table VII).

4.3 Evaluation of the digitization level according to the element of library

The digitization level according to the elements of a library was assessed by evaluators, who belonged to the library. Among the elements of the library, the next generation services scored 90.89, the SNS service 79.41, and the library program service 77.38, and were determined to be conventional. Classification and cataloging, which scored 70.66, acquisition 67.25, and organization and employees 54.03, were determined to be digitized. Conversely, the book collection (66.09), circulation services (54.72), reference services (65.64), user services (65.90), library program services (77.38), space services (70.88), the SNS service (79.41), device providing services (53.00), the next generation service (90.89), and what our library is (59.73) were considered to be conventional. The digitization level was similar in the circulation service, the organization and employees, and the device providing service, but the next generation service was evaluated overwhelmingly to be conventional. As the responding libraries scored 62.91 for being conventional and 35.06 for being digitized, they was mostly evaluated as being conventional (Table VIII).

5. Conclusions and future research

5.1 Conclusion

This study divided the elements of library into conventional elements and digital elements to determine which elements were found most in an individual library. It was not meant to say that having more digital elements made the library better or having more conventional elements made the library worse. For example, the library programs might have more offline characteristics in the participation of many people, but it did

Conventional				Digital		
Code	Sum	Mean	Element of the library	Sum	Mean	Code
A1	2,167	41.32	Acquisition	3,033	58.68	A21
A2	1,646	31.57		3,599	69.31	A22
A3	1,305	24.87		3,895	75.13	A23
A4	1,845	35.74		3,355	64.26	A24
A5	1,644	31.65		3,586	68.88	A25
Total	8,607	33.03		17,468	67.25	Total
B1	4,307	83.19	Collection (physical online collection)	903	16.99	B21
B2	2,979	58.86		2,121	40.22	B22
B3	1,708	35.88		2,792	63.05	B23
B4	2,538	53.11		2,062	45.48	B24
B5	3,031	59.87		1,769	36.72	B25
B6	4,785	77.46		1,115	22.53	B26
B7	3,140	61.03		1,960	38.97	B27
B8	3,380	65.86		1,620	32.85	B28
B9	4,073	80.75		827	17.70	B29
Total	27,589	64.00		17,836	34.95	Total
C1	1,885	36.72	Classification and cataloging	3,115	61.68	C21
C2	783	15.28		4,362	85.42	C22
C3	1,688	32.78		3,512	67.22	C23
C4	1,420	27.67		3,680	72.33	C24
C5	1,425	28.79		3,275	66.67	C25
Total	7,201	28.25		17,944	70.66	Total
D1	4,635	92.64	Circulation service	365	7.36	D21
D2	2,805	56.35		2,095	42.10	D22
D3	1,435	31.40		2,965	64.37	D23
D4	1,210	23.74		3,780	73.29	D24
D5	1,575	33.87		3,025	63.17	D25
D6	3,880	81.39		920	18.61	D26
D7	3,088	63.67		1,812	36.33	D27
Total	18,628	54.72		14,962	43.60	Total
E1	3,857	74.21	Reference service	1,243	24.28	E21
E2	3,145	60.61		1,955	38.23	E22
E3	2,305	45.14		2,695	53.90	E23
E4	2,980	64.74		1,320	28.21	E24
E5	3,845	83.52		555	11.60	E25
Total	16,132	65.64		7,768	31.25	Total
F1	3,662	72.13	User service	1,438	27.87	F21
F2	3,577	70.67		1,523	29.33	F22
F3	3,587	70.78		1,433	27.55	F23
F4	2,915	57.46		2,085	40.93	F24
F5	2,220	43.59		2,780	55.14	F25
F6	2,555	49.94		2,445	48.67	F26
F7	2,480	48.67		2,520	49.56	F27
F8	4,660	94.99		240	4.88	F28
F9	3,870	82.37		630	12.87	F29
F10	3,012	59.95		1,988	38.75	F30
F11	3,715	74.34		1,185	23.28	F31
Total	36,253	65.90		18,267	32.62	Total
G1	2,340	49.45	Library program service	2,360	49.01	G21
G2	3,840	79.02		1,010	20.20	G22
G3	4,050	89.43		450	9.90	G23

(*continued*)

Table VII.
Evaluation for the digitization level according to items in the elements of library

Conventional				Digital		
Code	Sum	Mean	Element of the library	Sum	Mean	Code
G4	3,740	86.34		460	10.96	G24
G5	4,170	88.57		430	9.10	G25
G6	3,360	71.49		1,240	26.16	G26
Total	21,500	77.38		5,950	20.89	Total
H1	2,455	49.40	Space service	2,545	48.87	H21
H2	1,250	26.52		3,750	73.48	H22
H3	630	12.57		4,370	86.80	H23
H4	4,130	89.43		80	1.57	H24
H5	2,940	64.23		1,560	30.73	H25
H6	4,380	92.69		20	0.45	H26
H7	3,870	76.68		1,130	21.36	H27
H8	3,890	86.63		510	10.74	H28
H9	4,200	87.50		400	8.36	H29
H10	4,510	88.40		490	9.64	H30
H11	3,955	89.84		245	5.56	H31
Total	36,210	69.44		15,100	27.05	Total
I1	3,560	81.26	SNS service	740	15.52	I21
I2	3,440	78.68		670	14.95	I22
I3	4,150	88.38		450	9.54	I23
I4	4,240	83.46		670	12.81	I24
I5	4,230	90.06		370	7.67	I25
I6	4,165	82.89		690	14.14	I26
I7	3,760	76.66		720	14.98	I27
I8	2,600	55.11		1,900	40.79	I28
I9	4,160	85.17		650	12.81	I29
I10	3,850	79.85		850	17.93	I30
I11	3,825	76.08		1,075	21.54	I31
I12	3,780	75.30		1,120	22.32	I32
Total	45,760	79.41		9,905	17.08	Total
J1	4,125	80.25	Organization and employees	875	18.18	J21
J2	1,525	29.86		3,575	70.14	J22
J3	2,080	40.87		2,920	57.99	J23
J4	2,295	45.51		2,805	54.49	J24
J5	2,610	51.15		2,430	48.56	J25
J6	2,070	44.68		2,430	54.37	J26
J7	940	18.77		3,860	80.88	J27
J8	2,205	43.81		2,685	54.93	J28
J9	2,675	52.90		2,407	46.72	J29
Total	20,525	45.31		23,987	54.03	Total
K1	645	12.55	Device providing service	4,385	85.99	K21
K2	4,800	95.98		100	1.82	K22
K3	4,600	92.30		300	5.49	K23
K4	380	11.18		3,320	85.84	K24
Total	10,425	53.00		8,105	44.79	Total
L1	4,450	88.23	Next generation service	550	9.70	L21
L2	4,470	87.57		530	10.38	L22
L3	4,510	88.73		490	9.30	L23
L4	4,710	92.53		290	5.40	L24
L5	4,810	94.55		190	3.38	L25
L6	4,820	94.76		180	3.16	L26

Table VII. (*continued*)

Conventional				Digital		
Code	Sum	Mean	Element of the library	Sum	Mean	Code
L7	4,615	90.70		385	7.38	L27
L8	4,570	90.04		430	8.00	L28
Total	36,955	90.89		3,045	7.09	Total
M1	3,695	73.29	Our library is	1,405	26.84	M21
M2	3,825	75.63		1,265	24.17	M22
M3	3,140	61.80		1,970	38.41	M23
M4	3,070	60.18		2,030	39.82	M24
M5	3,665	72.28		1,415	27.37	M25
M6	1,525	29.63		3,575	70.37	M26
M7	1,885	36.54		3,215	63.46	M27
M8	2,685	55.34		2,165	44.31	M28
M9	3,610	72.88		1,380	26.91	M29
Total	27,100	59.73		18,420	40.18	Total

Table VII.

Conventional			Digital	
Sum	Mean	Element of the library	Sum	Mean
8,607	33.03	Acquisition	17,468	67.25
27,589	64.00	Collection (physical online collection)	17,836	34.95
7,201	28.25	Classification and Cataloging	17,944	70.66
18,628	54.72	Circulation service	14,962	43.60
16,132	65.64	Reference service	7,768	31.25
36,253	65.90	User service	18,267	32.62
21,500	77.38	Library program service	5,950	20.89
37,110	69.44	Space service	15,100	27.05
45,760	79.41	SNS service	9,905	17.08
20,525	45.31	Organization and employees	23,987	54.03
10,425	53.00	Device providing service	8,105	44.79
36,955	90.89	Next generation service	3,045	7.09
27,100	59.73	Our library is?	18,420	40.18
319,344	62.91	Total	144,691	35.06

Table VIII.
Evaluation for the digitization level according to the element of library

not imply that the lack of digital elements made the library far behind the times. This study aimed just to measure whether the elements of the library were more conventional or more digital.

The purpose of this study is to measure whether the elements of the library were more conventional or more digital. The elements for determining whether the individual library was conventional or digital were initially extracted, and 13 items were selected to be used in an axis of comparison through consultations with experts: acquisition, book collection (physical/online collection), classification and cataloging, the circulation service, the reference service, the user service, the library program service, the service space, the SNS service, the organization and employees, the device providing service, the next generation service, and what our library is. Part II is comprised of the evaluation results of the last five items among the 13 evaluation elements. And, if we were to summarize and present the results, they are as follows.

First, the rate of providing library services utilizing the SNS service scored significantly low with 17.08, and the element of next generation service also scored significantly low with 7.09.

Second, the organization and employees of the library showed slightly more digital characteristics; the item of learning by oneself to be socially integrated scored significantly high with 80.88.

Third, in evaluating whether our library was overall digital or conventional, many evaluators concluded their libraries to be more conventional; the average score was 59.73 for being conventional and 40.18 for being digital.

Furthermore, the study analyzed the digital libraries according to the elements and library types; considering a slight difference, they showed digital and as well as conventional characteristics with a similar rate. As a result of comparing the averages to measure the digitization level according to the elements of a library, three elements such as acquisition, classification and cataloging, and the organization and employees section were determined to be more digitized; the digitized level and the conventional level of the acquisition were, respectively 67.25 and 33.03, of the classification and cataloging, respectively 70.66 and 28.25, and of the organization and employees, respectively 54.03 and 45.31. Other items showed significantly conventional characteristics with the most significant tendency being shown in the next generation service, which scored 7.09 for the digital characteristics and 90.89 for the conventional characteristics. The SNS service with 79.41 conventional to 17.08 digital, the library program service at 77.38-20.89, and the space service at 69.44-27.05 followed closely but less significantly behind.

In response to the request questions based on the results, first, in total 92 items of conventional and digital elements were symmetrically extracted to finally determine 184 factors as suggested in the Table III in pursuit of finding elements that characterized the conventional and the digital libraries.

Second, based on reviewing the previous research, it was found that a good amount of research was performed to extract the elements of the digital library. Jochumsen *et al.* (2012) compared the characteristics of the virtual and physical libraries according to the four dimensions of experience, involvement, empowerment, and innovation; Jochumsen *et al.* (2012) compared the physical and virtual libraries, the individual user-centered and the local community-centered, the book and the creation libraries, and the portal and the archive libraries according to the four dimensions. In addition, researchers such as Hendrix (2010), Singh and Sharma (2015), Yoon (1997), Nam (2011), and Noh (2014, 2015, 2016) worked to determine the characteristics of a digital library; however, none of studies were performed to comprehensively extract the elements of the conventional and the digital libraries symmetrically as in this study, and none of studies ever developed the index of evaluating the digitization level to actually perform the evaluation. Additionally, the researchers claimed that the libraries having both characteristics must choose one side or the other in considering the effectiveness, rather than that the digital library was more effective than the conventional library.

Third, in evaluating the digitization level of the target libraries in this study, some items in the elements of the digital and conventional libraries still showed more conventional characteristics by 62.91 percent than the digital characteristics by 35.06 percent.

Fourth, based on the axis for comparison of the 13 items, the highest digitization level of the elements was in acquisition by 67.25 percent and the lowest was the next generation service. In other words, tasks that could be replaced by the next generation service were still performed by conventional method. Thus, most of the items scored

more than 30 percent but the items of the next generation service and the SNS service scored relatively low with scores of 7.09 and 17.08, respectively.

To summarize the answers in response to the research questions based on the results: first, the elements that characterized the conventional and the digital libraries were finally determined by analyzing all kinds of literature and through consultation with experts. Accordingly, 92 factors were suggested for each of the conventional and the digital elements based on the axis with 13 items.

Second, up to now, some research was performed in pursuit of extracting the elements of a library according to the literature review, but comprehensive research was never performed as in this study. The research indicated that the libraries obtained one of the conventional or digital characteristics independent of the situation, rather than that the digital library was more effective than the conventional library

Third, in evaluating the chosen libraries used as the examples, it was observed that the libraries had more conventional characteristics among the elements of the digital and conventional libraries. Also based on the axis used for comparison of 13 items, elements such as the next generation service, the SNS service, and the library program service were more conventional, but elements such as classification and cataloging, acquisition, and the organization were more digitized.

5.2 Future research

This study selected the conventional and the digital elements of library in analyzing the literature and examples to evaluate the digitization level of the library based on the result; however, even though it was performed according to the consultation with experts, it is relatively limited to more wide-scope application as it was performed by an individual researcher. Therefore, in the future research at the national level should be performed to suggest the developmental direction of the library.

Furthermore, this study did not perform the evaluation for the digitization level of all libraries in the country but only of 19 public libraries, 16 university libraries, and 17 special libraries. It cannot say that the research results represent the digitization level of all types of libraries in the country. Consequently, it might be meaningful to perform future research for evaluating the digitization level of all libraries across the country at the national level. Also, after evaluating the digitization level, it would be helpful to politically establish strategies and more projects to develop the future-oriented libraries.

To cope with the environmental changes surrounding libraries and reflect the users' demands for libraries being future oriented, the libraries should evaluate their level in various aspects and continuously perform research to seek the developmental direction of the libraries. Even though this study sought to develop the questionnaire for evaluating the digitization level of library for the first time in the country, it should be modified and reinforced to reflect the times as well as new researchers' perspectives.

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