

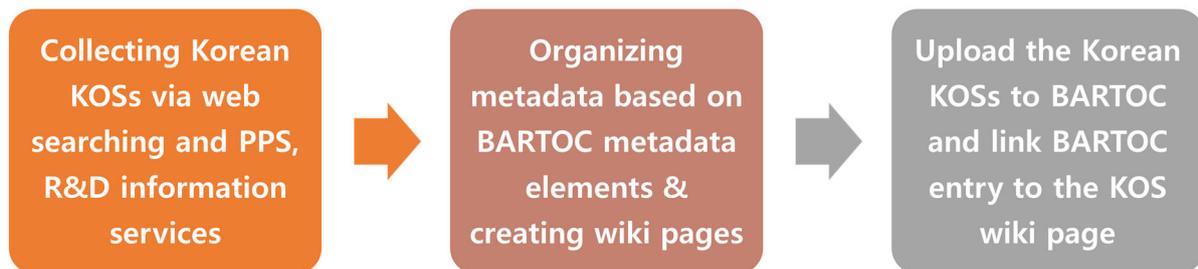
Collecting Distributed KOSs and Building Meta Information

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Overview

The purpose of this study is to collect Korean KOSs used in various fields, organize meta-information for individual KOS, and upload them to Basic Register of Thesauri, Ontologies & Classification (BARTOC) for integrated search with existing KOSs. The research was carried out with support from the National Research Foundation (NRF) of Korea from July 2019 to June 2022. This presentation mainly encapsulates the research results of the first and second years.



Introduction

The KOS is a generic term for tools such as classification systems, thesauri, and ontologies used to structure and utilize knowledge or product information in various fields. According to Dahlberg (1994), a pioneer in this field, knowledge organization (KO) has an interdisciplinary nature in that it organizes knowledge in each field. As for Broughton et al. (2005) and Hjørland (2008), KO is a concept that includes procedural aspects and tools for organizing knowledge. Therefore, various KOSs all have one thing in common: the support of the organization, management, and convenient retrieval of knowledge and information (Mazzocchi, 2018).

In other words, the KOS has been developed and utilized for various purposes across fields. In terms of analyzing domains and organizing and utilizing knowledge by field, the need for cross-references among KOSs is very high. However, the subjects that develop and utilize the KOS are different per field, and even in the same field, each country builds and uses the KOS separately. Thus, a KOS repository that systematically links distributed KOSs is required.

Therefore, this study aims to collect and systematize KOS information developed and utilized in each area of Korea. Currently, the author is working with fellow researchers as an editor of BARTOC, an international KOS repository. It was founded by Andreas Ledl and moved to the Verbundzentrale des GBV (VZG) in 2020. BARTOC editors can contribute to individual KOS registrations and various studies are being conducted based on the openness and cooperation system of the BARTOC database (VZG, [2022]).

Collection of Korean KOSs

At the beginning of the study, the researchers searched for keywords such as “KOS” (Korean Language), “Republic of Korea” (Location), and “Korea” (Korea) to investigate the number of Korean KOSs uploaded to BARTOC. In 2019, 36 domestic KOS searches were found, but only 4 Korean KOS cases were reported, and only 3 valid links were found. However, there were cases where the link was not valid, or the metadata of the KOS was insufficient.

Accordingly, to collect and systematically manage Korean KOSs, this study first investigated how KOSs are being developed and used in each field in Korea. In the case of domestic KOSs, there was no tool for comprehensive browsing, so it was necessary to collect KOSs used mainly for public or research institutes.

In continuously collecting KOSs, it was found that Korea primarily orders external projects to establish a classification system from a national institution called the Public Procurement Service (PPS). Several public institutions that use classification systems, such as Statistics Korea (KOSTAT) or Korean Intellectual Property Office (KIPO), are developing or updating classification schemes through projects to external companies or researchers. Therefore, in the case of public institutions, it was possible to comprehensively know what types of KOS were developed or maintained in one year through the *Korean ON-Line E-Procurement System*.

The screenshot shows the '나라장터' (Korea ON-Line E-Procurement System) interface. The main content area displays a list of procurement announcements under the heading '입찰공고 목록'. Three specific announcements are highlighted with red boxes and callout boxes:

- Item 1:** A study on the classification system for surgical elective non-reimbursement of the National Health Insurance Service. (공고번호: 20220636136-00, 분류: 의과 선택비급여 분류체계 연구, 주관: 국민건강보험공단)
- Item 2:** A study on reevaluation of innovative medical device groups and revision of classification system of the Korea Health Industry Development Institute. (공고번호: 20220604286-00, 분류: 혁신의료기기군 재평가 및 분류체계 개정 연구, 주관: 조달청 충북지방조달청)
- Item 3:** Establishment of the classification system for the ultra-high performance computing industry of the Korea Institute of Science and Technology Information. (공고번호: B2022-000434-00, 분류: 초고성능컴퓨팅산업 분류체계 정립, 주관: 한국과학기술정보연구원)

Classification system development announcements on Public Procurement Service Website: Service Bid Information List Screen <<https://www.g2b.go.kr/index.jsp>>

In addition to the PPS website, it was also possible to find the announcement for the development of a classification scheme through the National R&D Information website run by the National Science & Technology Information Service (NTIS, [2022]).

The screenshot displays the National R&D Integrated Notification Screen. At the top, there is a search bar for '분류체계' (Classification System) and a navigation menu with options like '로그인' (Login) and '메뉴' (Menu). Below the search bar, the main title '국가R&D통합공고' (National R&D Integrated Notification) is shown. A secondary navigation bar includes '공고정보' (Notification Information), 'R&D사업일정' (R&D Project Schedule), 'MY공고' (My Notification), '알리미신청' (Alert Request), and 'RSS신청' (RSS Request).

A grid of government agencies is displayed, with a callout box pointing to it: "Information on the government agency that placed the project order". The agencies listed include: 개인정보보호위원회, 경찰청, 고용노동부, 공정거래위원회, 과학기술정보통신부, 교육부, 국무조정실, 국방부, 국토교통부, 기상청, 기획재정부, 농림축산식품부, 농촌진흥청, 문화재청, 문화체육관광부, 방송통신위원회, 방위사업청, 법무부, 법제처, 보건복지부, 산림청, 산업통상자원부, 소방청, 식물의약품안전처, 여성가족부, 외교부, 원자력안전위원회, 중소벤처기업부, 질병관리청, 통계청, 통일부, 특허청, 해양경찰청, 해양수산부, 행정안전부, 환경부, 다부처, 기타.

Below the agency grid, there is a search section with filters for '공고일' (Notification Date) and '공고규모' (Notification Scale). A callout box points to the '공고일' filter: "Government agency that placed the project order". Another callout box points to the '공고규모' filter: "Project name (KOS information to be developed)".

The search results table is shown below, with a callout box pointing to the '부처명' (Agency Name) column: "Government agency that placed the project order". The table has columns for '순번' (Serial Number), '현황' (Status), '부처명' (Agency Name), '광고명' (Notification Name), and 'D-day'. The '부처명' column is highlighted in red. The '광고명' column contains a list of project names related to classification systems. A callout box points to the '광고명' column: "Project name (KOS information to be developed)".

The '광고명' column contains the following project names:

- 산림산업분류에 의한 통계조사 체계 구축 방안 연구
- K-MOOC 강좌 분류체계 연구
- 기록물 분류체계 개발 및 비전자기록물 정리 용역
- 치과 선택비급여 분류체계 연구_재공고
- 의과 선택비급여 분류체계 연구_재공고
- 인천문화재단 기록물 분류체계 구축 연구용역
- 복지용구 품목 분류체계 개발 연구_재공고
- 혁신의료기기군 재평가 및 분류체계 개정 연구_재공고
- 기록물 분류체계 개발 및 비전자기록물 전수조사 정리 용역
- 치과 선택비급여 분류체계 연구

The 'D-day' column shows 'D-day' and 'D-1' for some entries. A callout box points to the 'D-day' column: "D-day".

National R&D Integrated Notification Screen <<https://www.ntis.go.kr/rndgate/eg/un/ra/mng.do>>

Through this process, as the research progressed, it was possible to stably grasp the classification system of public institutions and effectively collect the KOS information constructed as a result.

Building a Wiki Page Containing the Collected KOS Meta Information

In finding a way to manage the collected KOS effectively, it was decided that metadata explaining the KOS should be separately established. This is because there are many KOSs which is lacking explanatory information on their usage method. Moreover, some KOS webpages hide the exact URL information for direct access. For example, the KOS named “New patent classification system,” issued by the Korean Intellectual Property Office (KIPO) is available online. However, it may be difficult to access internationally and intuitively understand because it is in the form of an attached file or a menu on the web.

Provided by pop-up image file

Provided by image icon menu

Provided by attached file

인공지능 →	빅데이터 →	클라우드 컴퓨팅 →	차세대통신 →
사물인터넷 →	지능형 로봇 →	자율 주행차 →	드론 →
가상증강현실 →	스마트시티 →	맞춤형 헬스케어 →	혁신신약 →
지능형 반도체 →	첨단소재 →	신재생 에너지 →	3D프린팅 →

관련 자료 (Related Resources)

기술설명 다운로드

Screenshot of the “New Patent Classification System Related to the Fourth Industrial Revolution” Provided by the Korean Intellectual Property Office <<https://www.kipo.go.kr/ko/kpoContentView.do?menuCd=SCD0200271>>

In particular, the collected Korean KOS was intended to be uploaded to BARTOC, the KOS repository, during which it was necessary to present rough information on the KOS. Therefore, the basic metadata based on the BARTOC meta elements are organized as below:

No	Title (Korean)	Title (English)	Scope	Description	KOS Type	DDC	EuroVoc	ILC
256	관광용어 외국어 용례사전	[Foreign Language Usage d	번역		Glossary	418 Standar		translation
257	서울시 외국어 표기사전	[Dictionary of foreign lang	번역		Glossary	418 Standar		translation
258	예술원 회원	[Academy of Art's Artist N	예술작가(문학, 미술, 음악, 연극, 영화)		Name authority list	709 History		artistic profession
259	옛 문헌 한자어	[Terms of Sino-Korean wo	한자어, 고문헌		Dictionary ; Glossary			
260	국방전자조달 용어사전	[Terms of defence e-procu	군수품, 조달, 전자조달		Glossary		0821 def	t6c: contra
261	산림행정순화용어	[Refine Terms of Forest Ad	산림 행정	산림청에서는 그동안	List ; Terminology	634 Orchar		forest
262	Tox-Info 용어사전	Toxicity information servic	식약품, 화학물	tox-info(toxicity information service)	Glossary	613 Person		drug addsh3p: drug
263	[원자력통제기술용어] 용어	[Nuclear Terminology]	원자력, 핵안보	초성검색으로 핵비확산	Glossary	539 Modern		nuclear safety
264	해양수산과학기술 분류제	[Marine Science Technolog	해양수산과학기술		Classification Scheme	551 Geology		oceanography
265	국방기술표준분류	[Standard Classification of	국방기술		Classification Scheme	355 Military		military science
266	무기체계표준분류	[Standard Classification of	무기체계		Classification Scheme	355 Military		military science
267	건설정보분류체계	[Construction Information	건설정보	건설사업 과정에서 발	Classification Scheme	600 Techno		technology ; building
268	식품·의약품 등의 안전거	[Classification of Food and	식품의약품 안	식품의약품안전처의 인	Classification Scheme	610 Medicin		medical dv4: using t
269	식품의약품용어집	[Terms of Food and Drug]	식품의약품		Glossary	610 Medicin		medical dv4: using t
270	항공용어 사전	[Terms of Aviation]	항공		Glossary ; Terminology	387 Water,		civil aviation
271	공직분류체계	[Classification of Public Of	행정, 공무원, 공직		Categorization Scheme ; Classification Scheme			

Basic metadata for the Korean KOSs are organized based on the BARTOC metadata elements

In addition to the basic metadata, basic descriptive information on the KOS was built on the MediaWiki platform before uploading to BARTOC. This is not only to upload Korean KOS itself to the BARTOC but also to support global researchers in understanding Korean KOS in detail. Although built around Hanguk as a Wiki page, it is composed of text, so one can use the browser's translation function. One may also check the contents in a unified manner because it provides various KOS information through the same interface. Moreover, it provides links to the source and other similar KOS information.

4차산업혁명 관련 新특허분류 체계

KOS, 우리 모두의 메타 지식

4차산업혁명 관련 新특허분류 체계(New patent classification system) 4차 산업혁명과 관련된 종전 7대 기술분야*를 16대 기술분야**로 확대 및 개선하여 선진특허분류(CPC) 체계에 추가하여 수립하였습니다. 세부 내용은 국제표준화 과정 및 개정 과정에서 일부 수정될 수 있습니다.

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4차산업혁명 관련 新특허분류 체계

저자 특허청

발행처 특허청

발행년 확인불가

KOS유형 분류체계

제공형 온라인 및 PDF 식

파일 4차산업혁명관련新특허분류체계

BARTOC <https://bartoc.org/en/node/20240>

Summarized information including KOS file and BARTOC URL

같이보기 [편집 | 원본 편집]

- 디자인분류코드
- 상품분류코드

외부링크 [편집 | 원본 편집]

- BARTOC URL <http://bartoc.org/en/node/20240>

각주 및 출처 [편집 | 원본 편집]

- ↑ https://www.kipo.go.kr/kpo/HtmlApp?c=33001&catmenu=m06_07_06 특허청

분류: 지식구조체계

Explanatory information for the KOS in textual form

Link information (related KOS, external URL, source URL)

"New Patent Classification System for the Fourth Industrial Revolution" Wiki Page

<http://openarchives.net/kos/4%EC%B0%A8%EC%82%B0%EC%97%85%ED%98%81%EB%AA%85_%EA%B4%80%EB%A0%A8_%E6%96%B0%ED%8A%B9%ED%97%88%EB%B6%84%EB%A5%98_%EC%B2%B4%EA%B3%84>

BARTOC Upload of Korean KOS along with Wiki Page Information

After structuring the collected KOS information and building a Wiki page, basic metadata was added, and a part of Korea's KOS was entered into BARTOC.

New patent classification system

edit

The screenshot shows the BARTOC Wiki page for 'New patent classification system'. The page content is enclosed in an orange box, with a callout 'Basic description of the KOS (English & Korean version)' pointing to it. The page includes a detailed description in English and Korean, followed by a list of titles and KOS types. A green box highlights the 'Links' section, with a callout 'MediaWiki KOS page URL' pointing to it. A red box highlights the 'Subject' section, which lists classification codes like 600, 5042, and 3707. A table on the right side of the page lists these codes with their corresponding terms: DDC 600 Technology, EUROVOC 5042 patent, EUROVOC 3707 industrial revolution, EUROVOC 4415 technology, and ILC tayne patents. A blue box highlights the 'Homepage' link, with a callout 'Source URL for the KOS' pointing to it.

Knowledge and Organization System Screen Uploaded to Basic Register of Thesauri, Ontologies & Classification
 <<https://bartoc.org/en/node/20240>>

By repeating this process, Korea's KOS maintained the meta information and created a continuous upload cycle to BARTOC. The procedure is as follows.

- Collect Korean KOSs.
- Identify the KOS information and construct the Wiki page.
- Upload the KOS information along with the Wiki page to BARTOC.
- Link the corresponding KOS URL of BARTOC on the Wiki page.

Currently, about 200 Wiki pages have been built, and about 200 Korean KOSs have been uploaded to BARTOC.

Future Works

The collection of Korean KOSs, the construction of meta information, and the uploading thereof to BARTOC were repeated for about three years. In the process, it was possible to analyze in detail the development and management system of Korea's KOS, and externally, there were changes and improvements in BARTOC itself.

As the research support from the NRF will end in June 2022, there is a task to stabilize the process of continuously monitoring and systematizing Korea's KOS. It is also necessary to add information that can link Korea's KOS with other KOSs in similar fields through the BARTOC integrated platform because the previously developed KOS is the main reference for developing a single KOS. In addition, the internationally linked KOS, such as the industry-standard classification, forms a network by itself.

Furthermore, all KOSs should be classified and indexed. In addition to the Dewey Decimal Classification, there is a plan to use the second edition of the Integrative Levels Classification more actively for KOS classification. If applicable, Korean Decimal Classification number can be added.

References

- Broughton, Vanda, Joacim Hansson, Birger Hjørland and María José López Huertas. 2005. "Knowledge Organization". In Leif Kajberg and Leif Lørring, eds., *European Curriculum Reflections on Library and Information Science Education*. Copenhagen: Royal School of Information Science, 133–148. [cited 2019.2.25.]. <<http://www.webcitation.org/6q0hjT516>>
- Dahlberg, Ingetraut. Knowledge Organization: A New Science? *Knowledge Organization*, 33(1). 11-19. (Translated and slightly revised version of a paper presented in German at the Conference on Conceptual Knowledge Processing, Darmstadt, 23.-26 February 2, 1994. Published in Wille, R., Zickwolf, M. eds. 1994. *Begriffliche Wissensverarbeitung. Grundfragen und Aufgaben*. Mannheim: BI Wissenschaftsverlag. pp. 225-38.)
- Hjørland, Birger. 2008. "What Is Knowledge Organization (KO)?" *Knowledge Organization* 35, nos. 2/3: 86–102.
- Mazzocchi, Fulvio. 2018. "Knowledge organization system (KOS)". *Knowledge Organization* 45, no.1: 54-78. Also available in *ISKO Encyclopedia of Knowledge Organization*, eds. Birger Hjørland and Claudio Gnoli, <<http://www.isko.org/cyclo/kos>>
- National Science & Technology Information Service (NTIS). [2022]. National R&D Information website. <<https://www.ntis.go.kr/rndgate/eg/un/ra/mng.do>>
- Verbundzentrale des GBV (VZG). [2022]. Basic Register of Thesauri, Ontologies & Classifications (BARTOC) website. < <https://bartoc.org/>>