

The Power of Proactive Information: A Prototype of Mobile Application for Bring the Value of Library Services to the Parliament

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Abstract: Parliamentary libraries are part of parliaments. They provide information products and services related to their main role, that is, to support parliamentary functions regarding the law making process, government oversight and constituency work. Citizens use part of these products and services when they are available.

The Library of the National Congress of Chile delivers a great part of its information services to Congress members and their staff, in the form of Web Systems and research documents generated by its professionals in matters of legislative interest.

One of the Library's main objectives is to become a Library 4.0, consolidating as a modern and innovative organization based on solid technological pillars arising from Industry 4.0, and by developing modern technological tools for data and information processing and usage, with a deep sense of collaboration with parliamentary work.

In this context, the way in which the Library delivers its products and services to the parliamentary community and citizens, also requires modernization as to provide a proactive and permanently updated service. The research's question of this work is: How does the Library better serve the parliamentary community, and indirectly citizens, to achieve effective use of the information products and services provided? In accordance with the notion that consumption online is the most appropriate form to distribute parliamentary outputs and that all online content should be suitable for mobile devices, we answered that research question with the implementation of a mobile application called "MiBCN" which is an application for mobile devices that provides parliamentarians, their staff and citizens in general, a set of tools and information services that the library offers to the community regarding the national parliamentary tasks. The updated Chilean Regulations (laws), Parliamentary advisory documents, district and circumscription statistics, library book catalog, parliamentary press, among others, are offered. This application is outlined according to whether a parliamentarian, parliamentary staff or citizens.

This paper presents key guidelines used by the Library's IT team for the design, development and implementation of the said mobile application, under a user focused approach. The implementation of this prototype application, still in trial phase, would allow the Library to identify the main services and products used by parliamentarians and staffers, and to acknowledge their interests, needs and fieldwork, hence promoting a better informed parliamentary community.

Keywords: parliamentary libraries services, mobile application, Library 4.0.

1. Introduction

The main objective for a parliamentary library as The Library of the National Congress of Chile (BCN) is to meet the parliamentary demand of products and services of information useful for the Member of Parliament functions [1]. This includes lending of library books and other materials and researching in topics of parliamentary interest and put in value the results of its researches making the political reports available to the parliamentary community in digital media. A secondary role of Parliamentary libraries is disseminating to the citizens the parliamentary work and offers services to be used by society in general.

According to The Inter-Parliamentary Union for Democracy, a modern parliamentary library, nowadays, is a digital space as well a physical place that relies on digital and communication tools to manage, research and to disseminate its information products and services [2]. The BCN has as one of its main objectives to reach the Library 4.0 to achieve its modernization, i.e. to establish a modern and innovative library, based on solid technological pillars, arising from Industry 4.0, using modern technological tools for data and information processing and use it with an appropriate sense to the context of parliamentary work. Library 4.0 will improve the quality of the information services that the BCN produces to parliamentarians, in order to provide them with better information products and services, modern and assertive in opportunity, means, fast and effective to parliamentary interests.

The Library 4.0 has several components as illustrated in Figure 1: Library 4.0 components. The BCN has different research projects and application in areas like Cloud Computing, Big Data, Systems Integration, IoT and Cybersecurity.

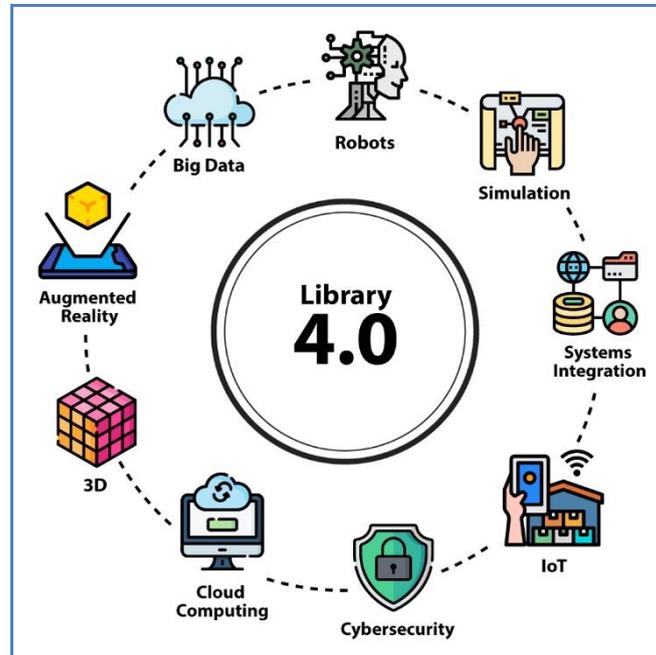


Figure 1: Library 4.0 components

The concept of library 4.0 has very concrete characteristics. These are, in the first place, ubiquity, understood as being connected at any time and place; in the second place, identity, referred to personalized services according to the different profiles of the users and; in the last place, connectivity, that is to say, the coherent connection with other users.

According to Kroski [3] library 4.0 includes several important components for present-iteration digital as new services based in technologies, mobile apps for mobile content and new transmission formats like social network and attractive user experience. We consider this concepts for develop the new services.

In this context born the research question: How does the Library better serve the parliamentary community, and indirectly citizens, to achieve effective use of the information products and services provided?

After analysis of statistics about services use, brainstorming with parliamentarians, his assessors and a group of experts from the Library, and in accordance with the notion that consumption online is the most appropriate form to distribute parliamentary outputs and that all online content should be suitable for mobile devices [4], the key for answer this research question is a technological solution to make the products and services of information available in the form of a mobile application that allows the library bring all the power of research and information services. Through a mobile application installed in smartphones and other mobile devices, congress members and their

staff could have the library's main information products and services "in the palm of their hand", achieving greater deliverance efficiency and avoiding explicit service requirements. Safeguarding access roles, the same mobile application would also deliver public information to citizens. In this way, and following the concepts of Library 4.0 [5], providing the Library with ubiquity in the Massive Data Library and Context Aware dimensions

The main objective of this paper is to present the key guidelines, used for the IT team of the BCN for design, develop and implement a mobile application with its information services oriented to the parliamentarian community and the citizens who are users of the library.

The structure of this paper is as following, in chapter 2 we present a global vision of the project starting with its objectives, the team who worked in it, the initial idea and a map of services to cover. In chapter 3 there are a list of technical requirements considered in the design of the application and their categorization for organize them across the application functionalities. Chapter 4 presents a description of the application, including an architecture diagram, and the application functionalities through a series of screen prints. Chapter 5 explains and shares our experiences in the development and building of the application, including stores implementation, security, confidentiality access, costs and other inherent aspects for made and put the mobile application in production, including difficulties encountered in their creating and testing. Finally, this paper finishes with the objectives reached at the current stage of the application and declares the new topics under research for the future work.

2. The project

This Project is developed under consideration of the recommendations from PMBOOK [6], applied to the management of information technologies projects. In its initial phase it begins with the signing of the Act of Initiation by the authorities and sponsor of the project inside the Library, establishing the scope of the project and the milestones to be met. Then using an iterative-incremental approach based on the principles of the agile methodology, through iterations of the development progress, building and testing the various functionality modules of software, have refined different versions of the application, to reach the first version, which is available in Google, Apple and Huawei stores.

Overall Objective

The objective of this work is to enable a new way of efficiency in the quality of our services and to improve the positioning of the library within the National Congress, on our target audience, this is the Parliamentarians and their assessors, through the development of a mobile application that facilitates the use of the library's main information products and services and to interact with them across this new platform.

Specific Objectives

In order to achieve the above objective, the following specific objectives were defined, which allow to classify the achievements of this work

- i) Create a new communication channel between the BCN and the Parliamentarian, to meet the information needs of the Parliamentary community.
- ii) Automatically integrate the requirements received by this platform to the administrative workflows that enable the answer generation.
- iii) For extension, deploy a limited version of the mobile application to the citizenship with access to public services of the Library.
- iv) Collaborates with its use, to create and maintain a new integrated database of registered users of the services of the library.

Making the Team

The Project team was made up of specialists from the different areas of the Library's service producers, including the areas of Production of bibliographic services, Parliamentary technical staff, legislative services and studies, and specialists from the IT Department. There are Librarians, Lawyers, Designers, Computer Engineers and specialists of multiple disciplines who elaborated parliamentary advisories, participating in this team.

All the specialists provided the strategic vision of their specific area, so that the presence of the following groups of services in the application was specified:

- Search for Laws
- Parliamentary Work Information
- Parliamentary Technical Consultancy
- Bibliographic Catalogue
- Online Press Service

Initial Idea of the project

In its initial stage, this Project was conceived as a source of integration of the information services provided by the library to its users, through digital media, such as the various applications developed for the main functional areas. In this way, we seek to incorporate a new way for the delivery of information services, capture of requirements of our users and delivery of responses to such requirements. This is illustrated in Figure 2: Initial Functionality design.

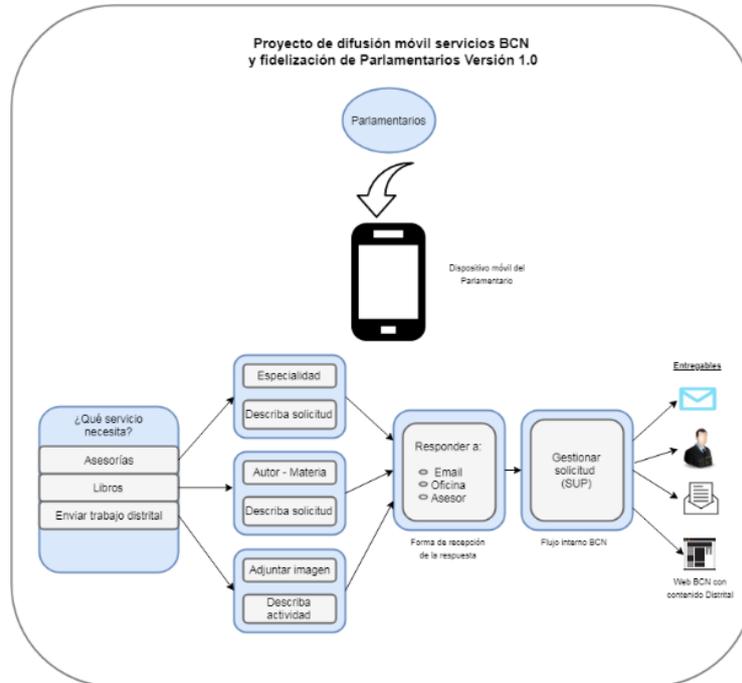


Figure 2: Initial functionality design

Integrated Services

All the above information services are offered as Web Services, which come from the various online information systems, which constitute the digital services offered by the Library.

By breaking down the groups of services, we obtained the following detail of information services that the Library offers to its users, which we can reflect in the following Services Map illustrated in Figure 3.

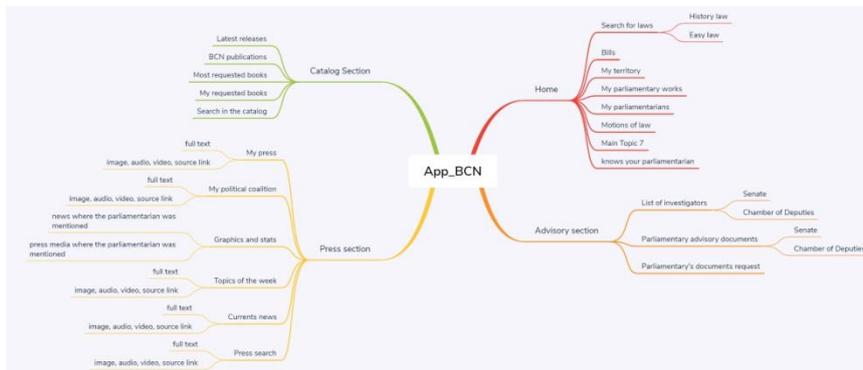


Figure 3 Services Map

The product of this project

A mobile application, refined through prototypes, with the main services of the library and available for download in the main stores: Apple Store, Google Play and Huawei gallery.

3. Requirements

The analysis of service statistics, the brainstorming with parliamentarians, his assessors and a group of experts, allowed us to raise the guidelines of the project, and setting the following technical requirements and categorization:

- a) **Technical Requirements:** The application must comply with the following technical requirements:
 - i) In-house development: Taking advantage of the knowledge of the business of a parliamentary library by the IT staff.
 - ii) Application must be published in Google Play and Apple Store for later download by interested users
 - iii) Use of hybrid technology that allows a unique mobile development and presents the better projections in terms of development time, international standards, stability, scaling, responsive adaptation, and performance, for publication in both stores. This definition implies the use of a unique source code, runnable in both platforms
 - iv) 100% utilization and integration with the existing databases of the currently in production systems.
 - v) From the point of the architecture, use a 3-layer model (presentation, business and database).

- b) **Categorization Sections:** Following is a list of the functional requirement to be satisfied by the application:
 - i) Must use an authentication method to distinguish between parliamentarians and the general public (corporate emails vs other emails)
 - ii) **Home Section:** Contains search of laws, information on the processing of bills, statistical information of districts and constituencies, motions in law and its biographical review.
 - iii) **Library Assessors Section offers a list of Library Assessor by legislative commission and by subject, documents delivered by the Library to legislative commissions and the most recent documents.**
 - iv) **Press Section:** Provides parliamentarians with a useful tool to access the news from different sources in real time and keep the parliamentarian informed of their interest topics. When the news media publishes their latest editions, including news about the Parliamentarian or their parties, statistical graphs by date and media, the issues most addressed by the press in the week and recent news.

- v) **Catalog Section:** It contains the latest acquisitions available for loan; own publications and the most used resources.
- c) In addition, there must always be available an option for contacting the help desk of the Library at any time, to satisfy any requirement that is not considered in this mobile application, which is attended by a group of professionals and derived if necessary for a resolution out of the application.

4. Description of the Application

The required functionality is achieved with a mobile application developed in angular for IOS and Android environment, which has a main page that contains a functional menu with the main online services of the library and a series of icons that offer access to specific information resources for parliamentarians such as access to the motions of bills that he/she has presented, his personalized press with the latest and historical press articles from of interests of each parliamentary his parties, socio-economic information of the district he represents and of his current geographical location.

Architecture Solution

As a technological tools used, the application was developed in angular language, so that the same source code can be compiled for the IOS environment and for Android too without changes, facilitating its development and maintenance with a single code for both environments.

Figure 4 illustrates the technological architecture, where the use of the various information systems from the library on their respective platforms is appreciated, in summary these are:

Ley Chile System: Provides access to national legislation. A copy of this system resides in Amazon Web Services for its access.

Portal Web BCN: Provides access to all the information services produced by the library. This system is acceded from Amazon Web Services.

Press System: It has a database of more than 8M of press articles from 1940 to date. Contains historical press articles from 150 national and regional media, with emphasis in articles of parliamentarian interest.

History of the Law and parliamentary work System: Provides access to the motions of bills presented by each parliamentarian.

Repository: Has all the documentation of reports of specific topics of parliamentary interest, generated by the Parliamentary Technical Advisors of the Library.

Geographical System: Has georeferenced data of each commune of the country.

Bibliographic System: Catalog and Database of the books and other bibliographic information.

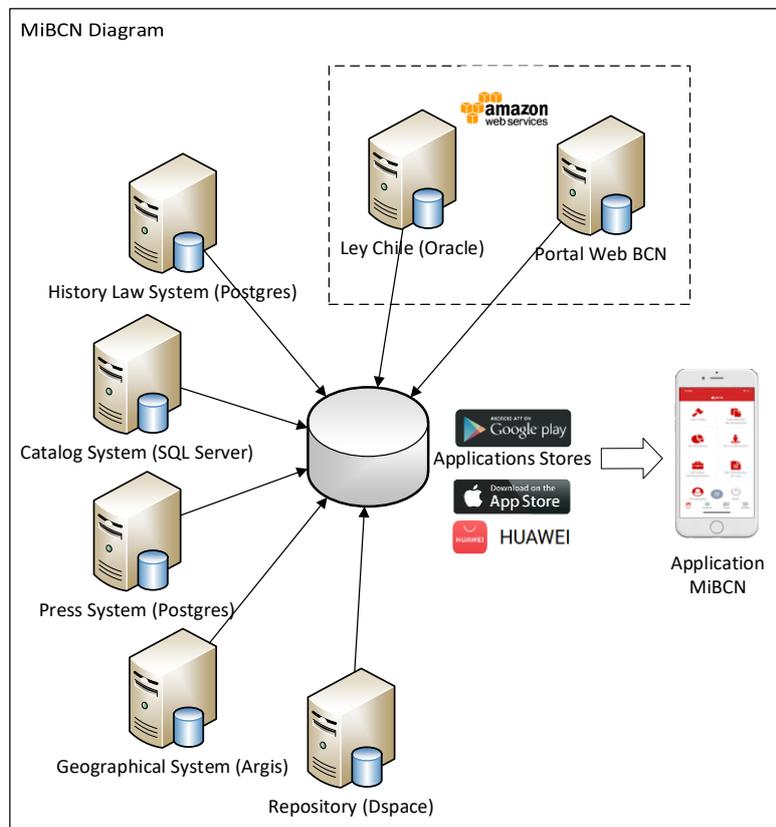


Figure 4 Architecture Diagram

Application Functionality and Print Screens

To access the application, each user of the parliamentary community must download it from the corresponding Store, then

activate it with a password that is automatically sent to their institutional mail. The general public must perform a similar process to use the application and access the published information.

Once activated, the user can access each of the available functionalities. Following, there are several prints screens to illustrate the capabilities of the application and its description:

<p>Figure 5: Main screen: This is the starting point of the application. The main section, illustrates the main services, is a view that groups the services offered by the library and that allows the parliamentarian to have direct contact with the library.</p> <p>Is the base screen always showed when a user access the application, offers a surf menu with the main services (Staff, Catalog, Press) Also offers icons for the most used options: Ley Chile, Law Projects System, My location, My Territory.</p>	 <p style="text-align: center;"><i>Figure 5: Main Screen</i></p>
<p>Figure 6: Ley Chile, access a search of the database with all the laws of the country with more than 320.000 laws and codes, has and advanced search with several relevant metadata. Allows Search for updated laws, Republic Codes, Political Constitution of Chile and Regulatory Framework of the Congress.</p>	 <p style="text-align: center;"><i>Figure 6: Ley Chile</i></p>

Figure 7: Law Projects System, offers a searchable tool for access the database of Projects of law, currently under discussion and develop. The Law Draft Processing System provides valuable information on the bills presented for discussion in Parliament and in what state of progress they are in to become law or be rejected. It shows the projects, including the considerations of the legislator, the transcripts of the sessions and the reports presented in both houses, according to the constitutional procedures that correspond to each legal initiative.



Figure 7: Law Projects

Figure 8: My District, offers statistical information of the territory that the parliamentarian represents. It is a quick view of the main indicators related to the district or constituency represented by parliamentarian. For example, population, population groups, poverty and income indicators, SIMCE results, health indicators, unemployment, jobs, among others.



Figure 8: My District

<p>Figure 9: My Location, offers Georeferenced information of schools, polices, firefighters and census, where the user is located. As in "My District" is a quick view of the main indicators of a district or constituency, but specifically where the parliamentarian is located.</p>	 <p><i>Figure 9: My Location</i></p>
<p>Figure 10: Parliamentary work: Summary of parliamentary activities in the session rooms, with its legislative work, interventions, requests and incidents.</p>	 <p><i>Figure 10: Parliamentary work</i></p>
<p>Figure 11: Motions of law presented by each Parliamentarian. Offers a searchable tool for each parliamentary access their motions of law in progress.</p>	 <p><i>Figure 11: Motions of laws</i></p>

<p>Figure 12: Bibliographic Catalog This section delivers, to the parliamentarian the latest news of the collections that the library has and also by themes. The parliamentarian may also request a resource that does not exist in our collection or a loan.</p>	 <p><i>Figure 12: Bibliographic Catalog</i></p>
<p>Figure 13: Most requested books This section delivers, to the parliamentarian the most requested books of the library, ordered by time.</p>	 <p><i>Figure 13: Most requested books</i></p>
<p>Figure 14: Bibliographic catalog details the catalog count with over 120 thousand records available in the application.</p>	 <p><i>Figure 14: Bibliographic catalog</i></p>

Figure 15: Publications BCN offers a searchable method for access to the publications created by the Library of Congress, in case of digital version, the user can download a copy of the publication.



Figure 15: Publications BCN

Figure 16: Press Section Updated information from the national and international media, also radio, television, web press and magazines.



Figure 16: Press Section

Figure 17: My press Latest news where the parliamentarian is mentioned, in over 90 press media, radio and television, web press and magazines.



Figure 17: My press

<p>Figure 18: My political party News where the parliamentarian's political coalition is mentioned during last two weeks and in over 90 press media</p>	 <p>Figure 18: My political party</p>
<p>Figure 19: Press Graphics Statistical information where the parliamentarian is mentioned, during the last two weeks and, in over 90 press media.</p>	 <p>Figure 19: Press Graphics</p>
<p>Figure 20: Biographical review General information of the Parliamentarian, including Politic career, personnel facts, studies, working life, electoral results, among others.</p>	 <p>Figure 20: Biographical review</p>

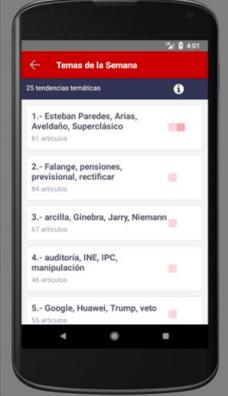
<p>Figure 21: Topics of the week Set the most relevant topics covered my news media, in the last week, according to the number of similar mentions in press articles.</p>	 <p><i>Figure 21: Topics of the week</i></p>
<p>Figure 22: Recent news Set the most recent news media, including over 90 national and international press like newspaper, web press and magazines.</p>	 <p><i>Figure 22: Recent news</i></p>
<p>Figure 23: BCN Staff Section List of investigators and parliamentary staff documents produced. Shows the research service provided by our institution according to the requirements of parliamentarians and their advisers.</p>	 <p><i>Figure 23: Advisory Section</i></p>

Figure 24: My Research Documents Offers access to research documents request by each parliamentarian, and elaborated by the library staff, from different topics of current political interest to bibliographic support.



Figure 24: My Research Documents

Figure 25: List of investigators Offers to parliamentarian a list of investigators available for made researches, in different areas of the knowledge, upon request for interest topics related with the law production process.

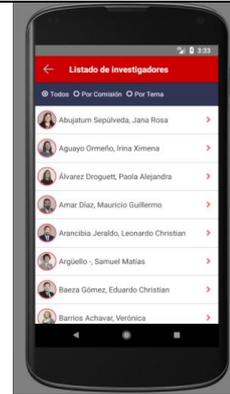


Figure 25: List of investigators

5. Implementations Details

Research and testing principles

To develop the project, initially we analyzed statistics on the use of the library's information services to measure their level of use and identify unmet requirements of current services. Research principles, were used through periodic meetings with the stakeholders to detect and refine the information needs and requirements to be met by the application. In addition, the brainstorming method was used with the judgment of experts in topics related to the work of parliamentarians and their advisors, where key functions were identified to solve information needs, such as: motions of bills, press monitoring of parliamentarians, documents of library's research on topics of legislative interest.

Once the first prototype was made, a usability test of the application and a white running stage were carried out to detect failures or lack of coverage of the implemented requirements.

Stores implementation

Initially, the application has been developed for implementation in the main distribution and certification stores for mobile applications, effective in 2019: Apple store and Google play. For this, the IT team had to register as a validated developer in said stores, paying the fees a total of US \$ 124, as first time and US \$ 99 per year to renew. Lately was added in Huawei store, free of charge. Currently, the application can be downloaded from:

- Apple Store: <http://bcn.cl/2ajki>
- Google Play: <http://bcn.cl/2ajki>
- Huawei Gallery: <http://bcn.cl/2np1j>

Security, certification and confidentiality aspects

In terms of confidentiality of the data captured by the application, the terms of use of the application certify that it does not collect confidential information from the user and its use of the functionalities of the mobile device. Only the traceability of user activities on this application is stored. With this terms, we certificate that these data are recorded anonymously, complying with current legislation: Law on protection of private life [7], and could be used for subsequent statistical analysis, about the use of the application, identification of the most used products, in order to improve the information services provided in this application or other channels such as the BCN Web portal www.bcn.cl.

The content of the data showed by the application, are consumed as services provided by each of the BCN's information systems, respecting the institution's information security policies implemented in each system. The own data, registered by the application, are stored in servers hosted in the institutional data center, safeguarding the physical and virtual access policies according to the institutional procedures based on his certification of ISO 9001:2015 standard, related to Quality Management System of Ley Chile, which includes the datacenter access rules, and the storing of backup tapes, in a site different from the institutional datacenter.

Access, reliability and stability of communication

The application consumes and presents the information services from different systems that the institution makes available to its users, which are hosted either in Amazon Web Services or in the institutional datacenter, achieving an uptime over 99.9%, which is generally accepted in the industry as reliable and stable [8].

Cost of maintaining production processes

The initial cost of developing and making the application available to the users was of the order of US\$ 34.410, taking into account a valuation of the invested H/H and implementation costs in the Apple and Google stores.

The cost of maintaining the application is of the order of US\$ 99 annual, due to the renewal of certificate to access the development platform in the Apple store, Google doesn't have annual renovation cost. In addition, the library estimates an annual investment of 100 hours of development engineers' time to incorporate eventual improvements to the application and perform version upgrades required by the stores.

Difficulties encountered in creating and testing the mobile application.

The main problems faced in the development and implementation of the application were, mainly, of a technical nature related to the versions of the operating systems. From the initial definition that the application was developed in a hybrid programming language to work in IOS and Android environments, the Angular framework was selected, in addition to its advantages, there was additional complexity developing in a single source code for both environments, for example the user authentication module follows different rules for each of them. These problems were solved by implementing an environment variable that identifies the operating system and allows selection to be applied in the programming of specific details required by each operating system.

On the other hand, each operating system version uses a specific version of a proprietary software development kit (SDK for Android, XCode for IOS), these kits are constantly evolving, generating new versions that directly affect the modules used by the platform, generating incompatibilities of some functionalities, impacting directly on the developed application and its operation over the different types of users' phones. To face this situation, it was decided to make the application as standard as possible, even though it is expected to be reviewed annually to determine the impact of the new updates required by the new versions of the operating systems and their associated SDKs.

6. Conclusions and results achieved

In this stage we have reached the declared objectives, because with the deployment of this application in Google Play Apple Store and Huawei store, we will start a new phase of the implementation of the Library 4.0 at The Library of the National Congress of Chile, that is to say, the Library have a new mobile application, ready to be downloaded by our users.

The developed application enables the capabilities for the following:

- i) To become a new communication channel between the BCN and the Parliamentarian community,
- ii) Automatically integrates the requirements received by this platform to the administrative workflows

- iii) Enables the Parliamentarian community a new way for interact with the Library
- iv) A short version of the mobile application could be used for to the citizenship for access to public services of the Library.
- v) Enables a way for create and maintain an integrated database of the registered users of the services of the library.

With all those objectives reached, we meet the main Objective of this project which is enable a new way of efficiency in the quality of our services and to improve the positioning of the library within its target audience, and for extension to the citizenship.

7. Future Work

The usage statistics allow us to identify the distribution of types of users of the application: 25% Parliamentarians 35% Parliamentary Community 40% citizens. This indicates that a greater investment is required in disseminating the application to parliamentarians and the parliamentary community, in order to increase the coverage of our main stakeholders.

Through the analysis of relevant information from the district work of parliamentarians, in a second phase, with the new information of use this mobile application will also serve to obtain patterns and behaviors that allow us to identify, understand and better classify the needs of our main users, applying intelligence over the data.

Chile is currently going through an unprecedented constitutional process, soon the citizens will have to democratically elect representatives who will have to write a new constitution for the country. These representatives are not parliamentarians, but legal ways are being studied to give them a rank similar to parliamentarians, but with a unique mission. In this sense, we are exploring the feasibility of modifying this application to create a new type of user and extend its use to these representatives, so that they have all the services that the library can provide them through the application, so they will have information inputs for their work of drafting a new constitution.

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