



# AI-Driven Legal Summarization for Regulation Monitoring

Central Bank of Chile

4th IFC Workshop on Data Science in Central Banking

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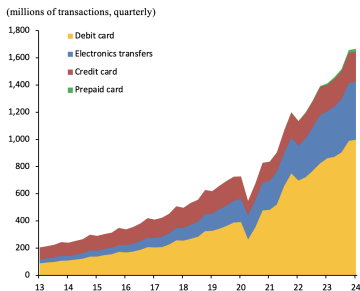
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# Agenda

- 1 Context and motivation
- 2 Data
- 3 Model and implementation details
- 4 Results
- 5 Final comments

- The Chilean payment systems industry has experienced significant growth in recent years, particularly in digital payments, which continue to show rapid increases in transaction volume, with new participants entering areas such as payment issuance and acquiring [1]

Figure: Digital Payment Transactions [2]



Note: Credit and debit card data include both businesses and individuals. TEF (Electronic Funds Transfers) data only account for individuals and include both intrabank and interbank transactions.  
Source: Central Bank of Chile based on data from the Financial Market Commission (CMF).

- The consolidation of this industry's development has created frictions among market participants, particularly concerning fees and the enablement of new business models [1].
- This has increasingly led some entities to seek resolution from institutions like the Tribunal for the Defense of Free Competition (TDLC) or the National Economic Prosecutor's Office (FNE), which provide legal solutions to these conflicts.
- These dynamics pose regulatory challenges for the Central Bank of Chile (CBCh), as one of its objectives under the Organic Constitutional Law (LOC) is to “ensure the proper functioning of domestic and international payments.”
- Consequently, it is **essential to understand and monitor the cases brought to the TDLC by various stakeholders in the payment systems industry.**

- **Problem:**

- Legal documents are lengthy, complex, and use terminology that is not accessible to non-experts, hence the need to have a comprehensive and timely overview of each case.
- Relevant information (issues, entities, and context) is often buried within extensive legal texts.

- **What we do:**

- 1 Customize a Large Language Model (LLM) to process original documents.
- 2 Generate one-page summaries highlighting key content in an accessible, high-level manner.

- Includes TDLC cases from 2016 to 2022 related to payment systems.
- Covers both contentious and non-contentious cases (19 in total, avg. 4 documents per case, 40-60 pages per document):
  - Contentious: Judicial disputes with judge intervention.
  - Non-Contentious: Petitioner-only cases; judge intervenes if required by law.
- Analyzed documents that focused on main claims and responses (counterclaims), which vary based on the number of entities involved.
- Each document is then split into chunks, with approximately 150 chunks per document

## ■ Case Files:

- May include numerous documents per case, in diverse formats with extended file lengths.
- New documents are uploaded regularly (as long as the case remains open).

Estado Diario

Causa: C-44-2022 D Demanda de Ebanx Chile Ltda. en contra de Servicios Visa Internacional Ltda.  
Causa(s) Acumulada(s): C-450-2022 D; C-448-2022 D;

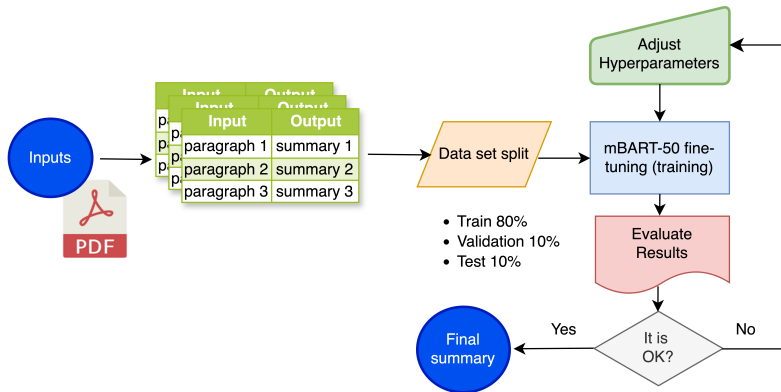
Cuaderno: Cuaderno principal Fecha Ingreso: 06/05/2022

Expediente			Información de Causa			Partes	
Título	Descargar	Detalles	Referencia	Fecha	Parte	Firmantes	Foja
Resolución	▲		Ha lugar	17-12-2024		👤	1151 - 1151
Escrito	📄		Reposición	02-12-2024	DLOCAL CHILE SpA		1150 - 1150
Resolución	▲		Ha lugar	26-11-2024		👤	1149 - 1149
Escrito	📄		Solicita lo que indica	07-06-2024			1113 - 1113
Escrito	📄		Solicita lo que indica	07-06-2024	DLOCAL CHILE SpA		1114 - 1114
Escrito	📄		Solicitud que indica	07-06-2024	Ebanx Chile Limitada		1118 - 1118
Escrito	📄		Solicitud que indica	07-06-2024	Ebanx Chile Limitada		1116 - 1116
Escrito	📄		Solicitud que indica	07-06-2024	Servicios Visa Internacional Limitada		1122 - 1122
Escrito	📄		Solicita lo que indica	07-06-2024	PAVU CHILE S.A.		1120 - 1120
Actuación	▲		Certificación_notifica resolución que indica	15-11-2024		👤	1148 - 1148
Resolución	▲		Se fija nueva fecha de audiencia de conciliación	14-11-2024		👤	1147 - 1147
Escrito	📄		Solicita lo que indica	12-11-2024			1146 - 1146
Actuación	▲		Notifica resolución que indica	05-09-2024		👤	1145 - 1145
Resolución	▲		Suspensión del procedimiento de común acuerdo	03-09-2024		👤	1144 - 1144
Escrito	📄		Solicita suspensión de procedimiento	30-08-2024			1142 - 1142
Resolución	▲		Téngase presente	02-09-2024		👤	1143 - 1143
Escrito	📄		Delega poder	28-08-2024	DLOCAL CHILE SpA		1140 - 1140

Figure: Example of TDLC case and platform



# Implementation



- Fine-tuning adapts a pre-trained language model to a specific task (such as summarization) using a smaller, task-specific dataset.
- It updates the model's weights to optimize performance on the new task while leveraging knowledge from pre-training [3].

# Implementation details

- Multilingual transformer model: [facebook/mbart50-large](#) [4]
- Input: Legal text chunks.
- Target: Human-made summaries.
- Dataset split: 80% training , 10% validation, 10% test
- Training Configuration:
  - Learning rate: 2e-5
  - Batch size: 4
  - Epochs: 8
  - Trainable parameters: 46.7%
- Evaluation: [loss & ROUGE](#)
- During inference, summaries are generated in chunks to simplify large documents into manageable extracts. A global summary is then produced in 2 stages, by aggregating these chunks and prompting the model again.

# Results: Metrics

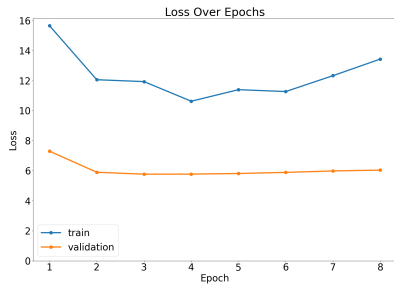


Figure: Loss over Epochs

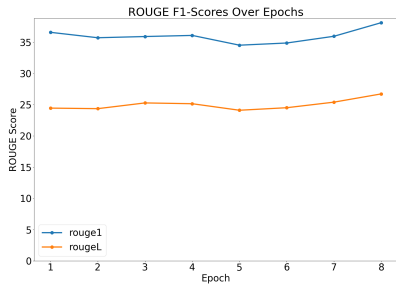


Figure: Validation ROUGE Scores (F1)

## Results: Example (1/2)

### Original chunk

22.- The advantage of cards associated with international brands -such as VISA- lies in the fact that they are accepted by the entire universe of merchants subscribed to the brand, regardless of the issuer, by virtue of the rule known as "Honor All Cards." This contrasts with cards tied to a proprietary brand, which do not enjoy universal acceptance and whose use is restricted exclusively to merchants affiliated with that proprietary brand. Consequently, the relevant market affected by the anticompetitive conduct carried out or entered into by VISA, Transbank, and Klap comprises the market of transactions conducted at electronic merchants using credit, debit, and prepaid cards of universal acceptance in Chile, since these types of cards enable cardholders to connect with the e-commerce platforms associated with dlocal, such that proprietary-brand cards are not capable of serving as substitutes in this type of transaction.

# Results: Example (1/2)

## ChatGPT - GPT 4o

International brand cards like VISA are accepted at all merchants affiliated with that brand, regardless of which bank issues them, thanks to the "Honor All Cards" rule. In contrast, proprietary brand cards can only be used at merchants that accept that specific brand. This means that the market affected by anticompetitive practices by VISA, Transbank, and Klap in Chile is the market for transactions at electronic merchants using universally accepted credit, debit, and prepaid cards. These cards allow users to connect to platforms like dLocal, while proprietary brand cards cannot serve as substitutes in these types of transactions.

## Fine-tuned model

The market affected by anticompetitive practices by Visa, Transbank, and Klap is the market for transactions at electronic merchants using universally accepted cards, which enable cardholders to connect to the commerce platforms associated with dlocal.

# Results: Example

## H. TRIBUNAL DE DEFENSA DE LA LIBRE COMPETENCIA

Luis Eduardo Toro Bossay, Francisco Bórquez Electorat, José Luis Corvalán Pérez y Catalina Villalobos Hinojosa, abogados, en representación de Servicios Visa Internacional Limitada, en estos autos caratulados “**Demanda de Ebanx Chile Ltda. en contra de Servicios Visa Internacional Ltda.**”, Rol C N° 444-2022, al H. Tribunal de Defensa de la Libre Competencia (“**H. Tribunal**” o “**H. TDLC**”) respetuosamente decimos:

De conformidad con lo dispuesto en los artículos 20 y 29 del Decreto Ley N° 211 (“**DL 211**”) y el artículo 308 del Código de Procedimiento Civil, contestamos la demanda interpuesta por Ebanx Chile Limitada (“**Ebanx**” o “**Demandante**”), en contra de nuestra representada, solicitando desde ya al H. Tribunal su rechazo en todas sus partes, con costas, en virtud de los antecedentes que pasamos a exponer.

En esta presentación, se verá con claridad la serie de imprecisiones y contradicciones de la demanda que Ebanx ha interpuesto en contra de nuestra representada, en donde ha intentado argumentar que la Regla de Restricción en Adquiere Transfronteriza de Visa (“**Regla de Adquiere Transfronteriza**” o la “**Regla**”) de Visa constituye un abuso de posición dominante, cuando en la práctica, ello no puede distar más de la realidad.

En efecto, la Demandante ha acompañado información incompleta para efectos de crear segmentaciones artificiosas del mercado relevante y confusiones acerca del verdadero efecto de

Figure: Original document

## Resumen

### Demanda

Ebanx Chile demandó a Visa Internacional por supuestas prácticas anticompetitivas, acusándola de abuso de posición dominante en el mercado chileno de medios de pago. Ebanx, que facilita pagos internacionales sin tarjetas internacionales, alega que Visa busca excluir del mercado mediante reglas restrictivas que limitan su acceso a la red de tarjetahabientes. Esto afecta gravemente su modelo de negocio, encarece las transacciones y restringe opciones para consumidores y comercios.

### Respuesta a la demanda

Visa Internacional responde a la demanda de Ebanx Chile, argumentando que la Regla de Adquiere Transfronteriza no constituye abuso de posición dominante, sino que asegura la seguridad y funcionalidad de la cadena de pagos, cumpliendo con normativas regulatorias, negando competir directamente con Ebanx, señalando que operan en mercados distintos.

Además refuta las acusaciones de exclusión de mercado, alegando que Ebanx ha presentado información incompleta, incumplido contratos de licenciamiento y distorsionado hechos. Sumado al hecho que su regla se aplica uniformemente a nivel global y garantiza prevención de fraude y cumplimiento normativo.

### Participantes

- **Ebanx Chile:** Empresa demandante, agente de recaudo internacional.
- **Visa Internacional:** Empresa demandada, acusada de prácticas anticompetitivas.
- **Transbank S.A., iSwitch S.A., Klap:** Adquirentes locales implicados en la implementación de las reglas de Visa.
- **PayU:** Competidor de Ebanx en pagos internacionales.

### Highlights



Figure: Generated summary (one-pager)

# Final comments

- This application makes it possible to create a model capable of producing specialized summaries on a very specific topic, thus helping our unit identify new business models in the payment industry and develop regulations that align with industry growth.
- There is the potential to use this tool for confidential documents, as it can ensure that the information never leaves CBCh's network and servers.
- Finally, this application is flexible enough to be tailored to the preferences and emphasis of a regulatory department manager, considering the subjective nature involved in training a model for this use case.

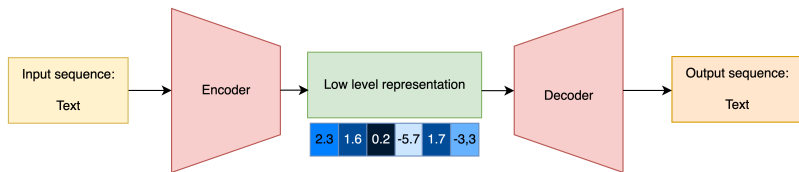
# Bibliography

- [1] C. B. of Chile, “Payment systems report,” August 2023.  
<https://www.bcentral.cl/documents/33528/4387742/Informe-de-Sistemas-de-Pago-agosto-2023.pdf/ec39444d-4623-05ee-aa4c-263cbcd72b11>.
- [2] C. B. of Chile, “Payment systems report,” August 2024.  
[https://www.bcentral.cl/documents/33528/6165052/ISIP\\_2024.pdf/880f1337-7904-2386-c815-077cfcb7896b](https://www.bcentral.cl/documents/33528/6165052/ISIP_2024.pdf/880f1337-7904-2386-c815-077cfcb7896b).
- [3] T. Wolf, L. Debut, V. Sanh, J. Chaumond, C. Delangue, A. Moi, P. Cistac, T. Rault, R. Louf, M. Funtowicz, *et al.*, “Huggingface’s transformers: State-of-the-art natural language processing,” *arXiv preprint arXiv:1910.03771*, 2019.
- [4] Y. Tang, C. Tran, X. Li, P.-J. Chen, N. Goyal, V. Chaudhary, J. Gu, and A. Fan, “Multilingual translation with extensible multilingual pretraining and finetuning,” *arXiv preprint arXiv:2008.00401*, 2020.



# Appendix: Model mBART-50

- mBART-50 is built on BART's sequence-to-sequence (seq2seq) Transformer framework, including an encoder and a decoder built for translation.
- It is pre-trained to reconstruct sentences from noisy inputs (masked or shuffled text), enabling it to learn deep linguistic representations.



## Appendix: Model evaluation

- **Loss function:** Cross-entropy loss, matching predicted and actual token sequences.
- **ROUGE** (Recall-Oriented Understudy for Gisting Evaluation): used to evaluate the quality of generated summaries, by measuring n-gram overlap between generated and reference summaries.
- However, note that ROUGE ignores semantic meaning and focuses only on surface-level word overlap.
- Human feedback is still valuable to improve the model, as summary quality is subjective and context-dependent.

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