Credit scoring solution based on telecom data
CRDP & K-Telco Score™
# Value Proposition

**What is K-Telco Score™**
K-Telco Score™ and CRDP (Credit Rating Delivery Platform) are KT financial intelligence solutions for alternative credit scoring that estimates individual’s willingness and ability to repay credit services like loan based on telecom big data analysis. As a highly probable business case of telecom data monetization, since 2016 KT has commercialized and delivered K-Telco Score™ information services to banks, card companies, insurance companies, and other lending companies and expanded the business into overseas emerging markets.

**Benefits of K-Telco Score™**
Financial institutions like banks, card companies, and micro lenders can increase customer base with lower risk of default. The credit underserved who were previously excluded from credit services can increase the chance to access credit services, e.g. loan. Telecom can realize data monetization by selling credit scoring information to banks and non-bank financial institutions.

**How to implement K-Telco Score™**
To implement telecom data based credit scoring, a telecom partner needs 3 core capacities:
- Financial intelligence analysis of telecom big data to derive the best candidate data for credit score modeling
- Credit score modeling technologies and models that estimate the possibility of default risk
- Application platform that implements big data analysis, credit score modeling, and delivery of credit information

**Why KT**
Since 1885, KT has been leading Korea telecommunication market as strong leader with over 55 millions of wireless and wired service users. Combined with big data technologies specialized for telecom, KT’s vast expertise and experience can support telecom partners to achieve successful business case of data monetization in financial sector by providing:
- Licensed solutions and implementation service in delivery model of supplier
- Solutions as in-kind investment for revenue sharing in delivery model of partnership
- Supplemental consulting for business, regulation, and telecom bid data utilization
# KT overview

<table>
<thead>
<tr>
<th>Company name</th>
<th>KT Corp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of establishment</td>
<td>10 December 1981</td>
</tr>
<tr>
<td>CEO</td>
<td>Chang-Gyu Hwang</td>
</tr>
<tr>
<td>Headquarters</td>
<td>90, Bulljeong-ro, Bundang-gu, Seongnam City, Gyeonggi-do, Korea</td>
</tr>
<tr>
<td>Number of employees</td>
<td>23,909</td>
</tr>
<tr>
<td>Revenue</td>
<td>KRW 23,387.30 billion</td>
</tr>
<tr>
<td>Homepage</td>
<td><a href="https://corp.kt.com/eng/">https://corp.kt.com/eng/</a></td>
</tr>
</tbody>
</table>

36 affiliates
- ICT / Real estate | 20
- Media / Contents | 7
- Financial | 6
- Other | 3

### Major financial affiliates
- **K** bank
  - 1st internet-only bank
- **BC** card
  - Payment leader
- Smartro
  - VAN and smart card

<table>
<thead>
<tr>
<th>FY</th>
<th>Unit</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless Communications*</td>
<td>Thousand persons</td>
<td>18,038</td>
<td>18,892</td>
<td>20,015</td>
</tr>
<tr>
<td>Wire Telephone—PSTN**</td>
<td>Thousand persons</td>
<td>13,268</td>
<td>12,791</td>
<td>12,201</td>
</tr>
<tr>
<td>Wire Telephone—VoIP</td>
<td>Thousand persons</td>
<td>3,413</td>
<td>3,436</td>
<td>3,409</td>
</tr>
<tr>
<td>High—speed Internet</td>
<td>Thousand persons</td>
<td>8,328</td>
<td>8,516</td>
<td>8,758</td>
</tr>
<tr>
<td>IPTV</td>
<td>Thousand persons</td>
<td>6,552</td>
<td>7,042</td>
<td>7,472</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>49,599</td>
<td>50,677</td>
<td>51,855</td>
</tr>
</tbody>
</table>

M/S 31% 2nd
- M/S 81% 1st
- M/S 41% 1st
- M/S 30% 1st
# Global Presence

24 Locations in 15 Countries
# Why Telecom Data

Telecom data is the best non-financial information for alternative credit scoring

**Credit underserved**
Lack of credit history trapped viciously into cycle of limited access to credit services

Only 10% of adults borrowed from FI

**Financial Institutions**
Lack of information for risk assessment, typically based on past loan repayment history

more customers with lower risk 30% Credit Information coverage

**Telecom**
Highest coverage of population with 24 hours of life insights

**Alternative Credit Scoring with non-financial data**

Individuals

Micro & Small Enterprises

Rich information for estimation of financial ability

Proxy information for repayment willingness estimation

Credit management characteristics

**data monetization**
# K-Telco Score™

K-Telco Score™ is an alternative credit scoring modeling and delivery solution using telecom data.

**Telecom Subscribers**
- Individuals
  - Mobile
  - Internet
  - IPTV
  - Wired phone
  - VAS
- Micro & Small Enterprises

**Financial Intelligence Analysis**
- Subscription
- Usage
- Billing & payment

**Credit Scoring Models***

* K-Telco Score™ supports logistic regression and machine learning modeling

**Application Platform (CRDP)**

**CRDP (Credit Rating Delivery Platform)**

**Information package**

- **Telco Score**
  - Credit risk
  - Clarification explanation
- **Telco Profile**
  - Summary of representative data for credit scoring
- **Basic Package**
  - Past 12 month data of main services

**K-Telco Score™**
- Score 867
- Information package

**Needs for risk assessment**
- Banks
- Non-bank FI
- Micro lenders
- Credit bureaus

**Individual**

**Micro & Small Enterprises**

**Information package**

- **SoHo Score**
  - Credit risk
  - Suspension & closing early warning
  - Financial needs

- **Telco Profile**
  - Summary of representative data for credit scoring

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**Distinctive Features**

- **Subscription**
- **Usage**
- **Billing & payment**

**Financial Intelligence Analysis**

**Credit Scoring Models***

* K-Telco Score™ supports logistic regression and machine learning modeling
# Progress

KT launched the first telecom originated credit scoring model in Korea in 2016.

![Diagram showing timeline and progress milestones.]

- **KT launched the first telecom originated credit scoring model in Korea in 2016.**
- **SoHo scoring model**
  - Credit scoring for micro and small businesses
- **Launch of K-Bank**
  - Logistic model for individuals
- **Launch of K-Telco Score™**
  - Big data scoring with K-Telco Score™
- **Prepaid market model**
  - Model expansion for prepaid dominant overseas market
- **Government support**
  - Positive credit scoring
  - Bonus points with proof of duly payment of utility and telecom bills

Timeline:
- '16.1
- '16.9
- '17.4
- '17.11
- '18.1
- '18.12
# Business Model

K-Telco Score™ service provides paid information of credit scoring to FIs as customers

## Business Model

- Telecom provides Telco Score and relevant information package to FI as target customer
- Telecom gets back information service fee from FI

* In Korea, credit information can be delivered only by registered credit bureau by law

## Information Fee

- Pay by use with unit fee per transaction
- Fixed prices for tiered ranges of transaction volume
- Annual price for unlimited use

## Service Flow

1. An applicant applies for loan with providing explicit consent for personal data utilization
2. FI requests for credit information to CB
3. CB requests for Telco Score to telecom
4. Telecom sends back Telco Score and relevant information package to CB
5. CB delivers Telco Score and relevant information to FI
6. FI provide loan with proper limit and interest rate
CRDP is telecom-oriented application platform for K-Telco Score™ implementation and its service delivery.

Credit Rating Delivery Platform

- Telecom systems
  - EDW
  - Subscriber management
  - Others

Data Management
- Real-time and periodic synchronization of telecom data
- Optimized architecture and management of high volume of raw data

Service Delivery
- Selective packaging of data tailored to customer needs through O&M
- Strong security with dedicated lines and KT encryption technologies
- Real-time delivery of information
# Target Data

Telecom has rich data to estimate individual’s ability and willingness to repay credit services

Candidate data for credit scoring (exemplary)

Financial Intelligence Analysis

- **Financial ability for repayment**
  - Income level, stability of life, consumption pattern

- **Credit management characteristics**
  - Repayment behavior, suspension management

- **Life pattern estimation**
  - Residence stability, employment, call networks

- **Financial interest**
  - Sensitivity to interest, demand for finance
# Target Data

Telecom data have good correlation with credit risk estimation of future’s possible default.

The correlation between telecom data and bad rates (exemplary):

- **Distribution of instances**
- **Bad rate**

### Variables:
- **Frequency of top-up gift**
- **Frequency of VOC**
- **Family bundling**
- **Balance of instalment**
- **Overdue repetition**
- **Call volume**
# Performance

K-Telco Score™ is one of the best override strategy to increase approval with less overdue

<table>
<thead>
<tr>
<th>Cut-off</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>C5</th>
<th>C6</th>
<th>C7</th>
<th>C8</th>
<th>C9</th>
<th>C10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- CB score only
- Override With Telco Score
- CB and Telco Score combined

Inherent bads

<table>
<thead>
<tr>
<th></th>
<th>Approval</th>
<th>Overdue</th>
<th>K-S</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB and Telco Score</td>
<td>11.3%p</td>
<td>0.1%p</td>
<td>8.0%p</td>
</tr>
</tbody>
</table>

Good
Bad

CB score
Telco Score

Increased approval with decreased bads
# Performance

Telco Score itself shows good separation and can be maximized when combined with CB score.

**Telco Score only**
- Prepaid dominant
- Only PCR with limited coverage
- Manual evaluation of loan application

**CB and Telco Score combined**
- Postpaid dominant
- PCR and CB with moderate to high coverage
- Underserved like thin filers

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**Good and bad discrimination**

**Thin filer rank ordering**
## Competitive Difference

Telecom has unequaled competitive edge in the range of data and telecom data utilization.

<table>
<thead>
<tr>
<th></th>
<th>Alternative credit scoring providers</th>
<th>KT K-Telco Score™</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>data source</strong></td>
<td>typically user’s mobile device (possibly from telecom as partner)</td>
<td>Internal database</td>
</tr>
<tr>
<td><strong>target service</strong></td>
<td>mainly mobile</td>
<td>mobile, wired, internet, IPTV, VAS, IoT, etc.</td>
</tr>
<tr>
<td><strong>data access</strong></td>
<td>limited to mainly usage data</td>
<td>unlimited to subscription, usage, and payment</td>
</tr>
<tr>
<td><strong>data update</strong></td>
<td>delayed update of change due to batched delivery</td>
<td>can apply any change in real-time</td>
</tr>
<tr>
<td><strong>credit proxies</strong></td>
<td>n.a.</td>
<td>bill payment, suspension, instalment</td>
</tr>
<tr>
<td><strong>others</strong></td>
<td>combined with other non-financial information (e.g. SNS)</td>
<td>Telecom specialized expertise and experiences (e.g. telecom services and systems, data utilization and monetization, telecom big data infrastructure)</td>
</tr>
</tbody>
</table>
## Reference

<table>
<thead>
<tr>
<th>Customer</th>
<th>context</th>
<th>Application of K-Telco Score™</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st internet-only bank in Korea</td>
<td>1st internet-only bank in Korea</td>
<td>Big data scoring for thin filer and mid-range loan</td>
<td>Overdue of mid interest range loan of 0.028% vs commercial banks of 0.43%</td>
</tr>
<tr>
<td>Telecom</td>
<td>1st telecom in M/S of prepaid dominant market</td>
<td>Microlaon for no or thin filers with no proof of income (CRDP on-site)</td>
<td>Overcome of lack of information and securing competitive advantage of credit scoring compared to existing banks</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Benefits</th>
</tr>
</thead>
</table>
Implementation

KT Financial intelligence analysis solutions specialized for telecom big data and preparation of data by partner are key to successful implementation of K-Telco Score™

<table>
<thead>
<tr>
<th></th>
<th>KT</th>
<th>Partner</th>
</tr>
</thead>
<tbody>
<tr>
<td>H/W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Servers</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Co-location</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>S/W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credit scoring models</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Application platform</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>OS and DBMS</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Implementation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data preparation</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Model and application customization</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Platform implementation</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>O&amp;M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-site operation and maintenance</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Off-site support for O&amp;M (remote with site visit if needed)</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Customer care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulatory compliance</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Consulting (if required)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business plan</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Regulation</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Data utilization and infrastructure</td>
<td>●</td>
<td></td>
</tr>
</tbody>
</table>
# KT offerings

KT supports 2 delivery options of supplier model and partnership model for revenue sharing

- **Supplier model**: license fee for S/W solutions and one-time cost for implementation and consulting
- **Partnership model**: KT contributions as in-kind investment for revenue sharing

**KT** supports 2 delivery options of supplier model and partnership model for revenue sharing. Credit service providers such as banks, non-bank financial institutions, credit card issuers, insurance companies, leasing companies, and capital providers are target partners. KT offers solutions in the form of regulatory and consulting models, and S/W solutions such as K-Telco Score™ models and CRDP. KT also offers services such as implementation, O&M support, and consulting. The fee for these services can be negotiated.

* Scope of contribution by KT and partner can be changed through negotiation
# Partner’s Benefits

With K-Telco Score™, partner can realize data monetization and strengthen its own telecom and financial businesses

**Data Monetization**

New opportunities of telecom data monetization businesses

- Building up successful business cases of telecom big data monetization
- Expanding big data utilization to other businesses, e.g. target marketing

**Risk Control**

Enhanced risk control for partner’s services that have possibility of default risk

- Big data based risk estimation can be applied to top-up credit service and postpaid micropayment service to minimize loss of repayment

**Financial Business**

Consolidating competitive advantage for partner’s own financial services

- Advanced credit scoring that provides competitive advantage for partner’s financial businesses, e.g. micro lending, internet-only bank, and etc.
## Prerequisites

Mandatory or key conditions for successful implementation and full benefits of Telco Score

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M1</strong></td>
<td>Partner shall keep subscriber identification information that can be matched with government recognized proof of identity for both of prepaid and postpaid subscribers</td>
</tr>
<tr>
<td><strong>M2</strong></td>
<td>Partner shall have data warehouse that collects and stores data from systems of target services</td>
</tr>
<tr>
<td><strong>K1</strong></td>
<td>Partner shall support real-time checking of subscriber’s status of subscription: e.g. suspension, deregistration</td>
</tr>
<tr>
<td><strong>K2</strong></td>
<td>Partner shall acquire comprehensive consent from all subscribers for collection, analysis, and utilization of subscriber information</td>
</tr>
</tbody>
</table>
## Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-Telco Score™</td>
<td>financial credit scoring modeling solution based on telco big data with logistic regression and machine learning technologies</td>
</tr>
<tr>
<td>CRDP</td>
<td>Credit Rating Delivery Platform that is an application platform to deliver K-Telco Score™ services to customers</td>
</tr>
<tr>
<td>credit</td>
<td>financial services that provide monetary values requiring beneficiary’s future repayment, e.g. loan, credit cards, etc.</td>
</tr>
<tr>
<td>credit score</td>
<td>numerical value that represents the possibility of risk of 60 or 90 days overdue within the next 1 year</td>
</tr>
<tr>
<td>credit scoring model</td>
<td>statistical predictive model that calculates credit scores of a loan applicant</td>
</tr>
<tr>
<td>cut-off</td>
<td>separation of loan applicants into approval or reject using their credit scores with pre-determined threshold</td>
</tr>
<tr>
<td>default</td>
<td>unpaid bad loan resulting in financial loss of the lender</td>
</tr>
<tr>
<td>expansion</td>
<td>enlarging candidates of loan acceptance by modifying the credit score threshold for loan approval</td>
</tr>
<tr>
<td>good and bad</td>
<td>status of credit repayment of a borrower with good as of duly repayment and bad as of override</td>
</tr>
<tr>
<td>K-S value</td>
<td>Kolmogorov-Smirnov Statistics value that measures discrimination performance of a credit scoring model (0~100)</td>
</tr>
<tr>
<td>logistic regression model</td>
<td>statistical models that extract estimators, typically 10~20, based on the past repayment data analysis</td>
</tr>
<tr>
<td>machine learning model</td>
<td>models that use machine learning algorithms with typically 100~1,000 variables</td>
</tr>
<tr>
<td>NBFI</td>
<td>Non Bank Financial Institutions, e.g. credit card companies, micro lending companies, lease, and capitals, etc.</td>
</tr>
<tr>
<td>overdue</td>
<td>status of delayed and unduly repayment, typically 60 or 90 days overdue is recognized to be bad loan</td>
</tr>
<tr>
<td>override</td>
<td>fine selection of loan acceptance after cut-off with internal policies for loan business operation</td>
</tr>
<tr>
<td>ROC value</td>
<td>Receiver Operating Characteristic that measures discrimination performance of a credit scoring model (0~100)</td>
</tr>
<tr>
<td>strategy</td>
<td>internal policies of loan operation, typically to maximize loan approvals while minimize risk of default</td>
</tr>
</tbody>
</table>
Thank you