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**DESCRIPTION**

SMEs Electronic Data System (SMEs\_eDS) Mobile-base App system have proven to be important tool to improve information access in rapid pace and Mobile App System is vital in ensuring data that can be accessed and updated at any location. However, SMEs-eDMS which will be an integration of eData system and Mobile-App system on all SMEs has not yet been widely implemented/adopted across Europe.

The objective of this MVP is to offer solution in reducing the financing gap among SMEs by ensuring a fair distribution of financial support during and after this Crisis in eData system and user-friendly Mobile App system to assist in determining the right financial support for each SME. Thus, who needs what (financial/advisory/technical), at where (which industry) and for what (business plan/model).

**TARGET POPULATION** ?

* Small and Medium- Sized Enterprises (SMEs)
* Government Agencies
* Start-ups
* Investors
* Researchers

The potential stakeholders are:

* The EU commission, Centre for Innovation , Research,Culture , Education and Youth
* Civil Society
* Non Government Organizations (NGOs)
* **Digital Education Action Plan**Member states statistical Office
* International organizations and donors
* **European Research Area**
* Researchers and innovators .

# **OVERVIEW OF SMES AND INVESTMENT NEEDS:**

**SMEs:**

* Assessment EU & Europe financing gap
* Evaluation of EU structural business statistics standard limits
* Classification of SMEs capital and revenue band
* Classification of economic activity level
* Identification of indicator (number of employees, Size, business type, product, year of operation etc.)
* Demographic classification (developed or developing states)
* Status catégorisations
* Identification of SMEs risk factors (thus, relation to different crisis situation)
* Risk aggregation
* Classification of financial support: mild, moderate and severe.
* Identification of SMEs investment needs

**INVESTMENT NEEDS: critical analysis and evaluation of SMEs case by case needs**

* Redesigning of capitalization (base on new business plan / model)
* Guarantee insurance
* Short-term facility with no interest
* Fast-track SMEs security market (access to the security market)

# **BENEFICIAL OUTCOMES**

* Establishment of robust eData system for efficient distribution financial support in this crisis and similar future situation.
* Consolidation of eData system and Mobile App
* Assist to reducing the SMEs financing gap
* Comprehensive and accessible Mobile App for data updates and status monitoring
* More personalized and efficient data assistance for investors to review SMEs.
* Decision-making mechanism to leverage risks.
* Ensuring a better understanding SMEs precautious needs.
* Regular transmission of SMEs data from the Mobile to the central eData system
* SMEs data collection and update in more decentralized manner for status monitoring
* Effective identification of SMEs with mild, moderate, or severe financial needs.

# **THE FUNCTIONALITIES :**

* System for detection, analyzing, risk clustering, categorization and predicting specific financial needs to an SME in crisis and post-crisis periods
* Prediction of industry to focus in order to mitigate financing gap
* Establishment of a centralized SMEs database link to decentralize Mobile App for data collection and updating.
* Determination of the 3Ws (who, where & what) for providing financial needs during & after this pandemic.
* Decision-making support and policy tool for the Commission, SMEs, government agencies, Start-ups, investors, donor, professionals etc.
* Prediction of severity needs in cases like covid-19.
* SMEs status can be known with just click and data can be received daily across Europe at any location instead of quarterly or annually.
* Can predict SMEs with other risk factors that would increase likelihood of financial

needs.

# **CHALLENGES / LIMITATIONS**

## Legal framework to be studied in terms of data collection, explainability [1], interpretability [2] of algorithm decisions.

### Lack of prioritization of SMEs-eDMS

### Limited computer skills

### High implémentations and maintenance costs

## Collecting big data and storing big data a centralize eData system.

## Access / integration / automation with many tools for SMEs data management

## The work capacity and usability of eData and end-users App to utilize the system

[1] An algorithmic decision is said to be explicable if it is possible to explain it explicitly on the basis of known data and characteristics of the situation. In other words, it is possible to relate the values taken by certain variables (the characteristics) and their consequences on the forecast, for example of a score, and thus on the decision.

[2] An algorithmic decision is said to be interpretable if it is possible to identify the characteristics or variables which are most involved in the decision, or even to quantify its importance.

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# **POTENTIAL OPPORTUNITY**

## Integrating our platform with other systems such as EU database, member states national SMEs database etc. in to a simple mobile App

* Generate a potential pool of cohorts [1] for researcher’s / data scientist’s/App developers / specialists for future studies.
* System can be used for other epidemic outbreaks financial needs allocation
* Support decision making process and monitoring policy impacts on SMEs

[1] A cohort is a group of people sharing a certain number of common characteristics, which researchers follow for a shorter or longer period of time in order to identify the occurrence of health events (disease or dysfunction of the organism) and factors of related risk or protection.

# **THE POTENTIAL DATA ON SMEs:**

|  |  |  |
| --- | --- | --- |
| Type of data | Source | Format |
| **SBS standard limit ( variables)** |  |  |
| Capital  Revenue  Number of employees  Size  Classification level | Collection of data from the commissions Databases or member states data centers | Data extracted from EU SMEs databases in electronic form and imported to eData system |
| **Economic activities (beyond SBS limit).** |  |  |
| Industry/sector  Service  Value Added  Investment  inputs  Specialization | Collection of data from the commissions Databases or member states data centers | Data extracted from EU SMEs databases in electronic form and imported to eData system |
|  |  |  |
|  |  |  |

**APPENDICES**

**Data labeling**

* Labeling of data based on business rules, and patent rights
* Collection of data from Commissions database, member countries data centers
* Labeling of data from Machine Learning, algorithms for data wrangling, analysis

**Exploratory and descriptive analysis of the data**

* Statistical data analysis & data mining
* SMEs segmentation into mild, moderate and severe needs
* Systemizing, explainability, and interpretability of machine learning algorithms
* Consideration of business feedback and expert’s opinions

**Selection of a better model for determining to financial needs to mitigate financing gap**

* Creation of data sets, selection of the representative sample
* Test and selection of the best models / hyper-parameters
* Bioethics, explainability, and interpretability of machine learning algorithms
* Carrying out screening tests for patients with covid-19

**Industrialization of the ML Pipeline**

* Establishment of a Machine Learning pipeline
* Implementation of a follow-up of experiments
* Implementation of model performance monitoring

**Export of prediction results**

* Creation of a Mobile App for the export of SMEs data to: A CRM / eData system
* Selection of SMEs with one or more of the predicted financial solution e. g recapitalization, securitization, short-term facility with no interest etc.
* Selection of SME investment category (mild, moderate or severe) for analysis in crisis situation
* Monitoring and evaluating of SMEs base risk aggregation.
* Transmission and updating of SMEs information from the Mobile App un to the centralized Data

**CHALLENGES TO FACE FOR SYMPTOM DETECTION**

* Legal aspect for the processing of sensitive data: expert in the subject - account with a DPO who helps to facilitate developments and ensure compliance with different laws.
* Data labeling: After retrieving the data, we are often obliged to label the data, necessary for training the models:
* Definition of business rules and identification of source tables
* Implementation of ML algorithms for data labeling (Auto-encoders, SMOTE, etc.)
* Forecasting on unbalanced data: We have already encountered this problem on its different customers and we have different techniques to deal with this problem: re-sampling, performance metrics (F1, sensitivity, precision, etc.)
* Garbage-in, garbage-out: We must ensure the quality of the data (or explanatory variables) before starting the developments. We always put a place for data validation to follow up and achieve the objectives set.
* Production of Machine Learning algorithms: In order not to remain in a POC stage, we have good practices and experience for the creation of pipelines to ensure: continuous development, testing, and monitoring of data and models.
* We can also create connectors with different CRMs to export the predictions so that it can be used by business experts
* Explanation of Machine Learning algorithms: Depending on the type of client, explainability can be the deciding factor for validation or not for production. We know how to work with different techniques such as: LIME, etc.

**LITERATURE REFERENCES:**

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<https://www.worldbank.org/en/topic/smefinance>

Minimum Viable Product or Multiple Facet Product? The Role of MVP in Software Startups

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