

Tailored IoT & BigData Sandboxes and Testbeds for Smart,
Autonomous and Personalized Services in the European
Finance and Insurance Services Ecosystem



D8.5 – IoT and Blockchain Solutions
Marketplace

Revision Number	1.0
Task Reference	T8.3
Lead Beneficiary	UNP
Responsible	Tiago Teixeira, Bruno Almeida
Partners	ATOS, UPRC, iSprint, NBG, INNOV, UNIC, NUIG, ORT
Deliverable Type	Report (R)
Dissemination Level	Public (PU)
Due Date	2021-09-30
Delivered Date	2021-11-10
Internal Reviewers	UPRC
Quality Assurance	INNOV
Acceptance	Coordinator Accepted
EC Project Officer	Beatrice Plazzotta
Programme	HORIZON 2020 - ICT-11-2018



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement no 856632

Contributing Partners

Partner Acronym	Role ¹	Author(s) ²
UNP	Lead Beneficiary	Tiago Teixeira, Bruno Almeida
UPRC	Contributor	Vasilis Koukos, George Galanos
INNOV	Contributor	John Soldatos, Ariana Polyviou
INNOV	Quality Assurance	

Revision History

Version	Date	Partner(s)	Description
0.1	2021-09-27	UNP	Draft, Table of Content
0.2	2021-10-02	UNP	Marketplace Front-end Update
0.3	2021-10-16	UNP	Marketplace Usage Scenarios
0.4	2021-10-20	UPRC, INNOV	Additional Contributions
0.5	2021-10-26	UNP	Minor improvements
0.9	2021-11-05	UNP	Version for internal review
1.0	2021-11-10	UNP	Final version

¹ Lead Beneficiary, Contributor, Internal Reviewer, Quality Assurance

² Can be left void

Executive Summary

This document provides an overview of the INFINITECH marketplace, which was established to provide access to the project's solutions, but also with a Virtualized Digital Innovation Hub (VDIH) to support the innovators (FinTech/InsuranceTech) in their BigData, AI, Blockchain and IoT endeavours.

Initially, two marketplaces were defined to offer the solutions and VDIH services regarding the project, but to facilitate the access to the information and create a large community around the INFINITECH, the INFINITECH Marketplace has been realized as one solution that brings together all the solutions and VDIH services. The INFINITECH Marketplace is therefore the result of the effort of two tasks, which are working together, T8.2 "BigData and AI Solutions Marketplace" and T8.3 "IoT and Blockchain Solutions Marketplace".

The current report is based on the architecture and the overall specification of the marketplace as defined in deliverable D8.2, with an emphasis on the INFINITECH Marketplace front-end, while deliverable D8.3 focuses on the back-end of the marketplace. Several updates have been introduced in the deliverable, including the updates on the front-end to realize a section to offer all the VDIH services that are up to now present on the INFINITECH Marketplace. Through that section (i.e. VDIH) of the marketplace, courses, workshops, webinars and accelerator programmes are made available.

In addition to the updates, new functionalities were added to create a community around the INFINITECH Marketplace, allowing users to interact with the platform. For this, the social login was implemented, and once registered, any INFINITECH user can provide information to the platform, through the forms available on each content page.

Based on updates on the front-end, the INFINITECH Marketplace offers a digital finance ecosystem where the users can know more about BigData, AI, Blockchain and IoT and share their solutions and services (assets, courses, webinars, workshops and accelerator programmes). The user can be an information consumer, but also an information provider, and each approach is exemplified through scenarios.

Table of Contents

1	Introduction	7
1.1	Objective of the Deliverable	7
1.2	Insights from other Tasks and Deliverables	7
1.3	Structure of the Document	7
2	Marketplace Front-end Update.....	9
2.1	Homepage	10
2.2	Assets	11
2.3	VDIH	14
2.3.1	Training Activities.....	16
2.3.2	Innovation Services.....	20
2.4	New Functionalities of Marketplace.....	22
2.4.1	Social Login	22
2.4.2	Add New Information	22
3	Marketplace Usage Scenarios.....	24
3.1.1	Scenario 1: Upload a VDIH	24
3.1.2	Scenario 2: Consult a VDIH	25
4	Conclusions	27
Appendix A - New Pages		28
	Courses Page.....	28
	Workshops Page.....	29
	Webinars Page	30
	Accelerator Programmes Page	31
Appendix B - Marketplace Forms		32
	Assets Form	32
	Courses Form	33
	Workshops Form	34
	Webinars Form.....	35
	Accelerator Programmes Form	36

List of Figures

Figure 1: INFINITECH Marketplace Structure	9
Figure 2: Homepage	10
Figure 3: INFINITECH Marketplace Resources.....	11
Figure 4: Financial Asset Recommender: Profitability Estimation	12
Figure 5: INFINITECH Marketplace VDIH Resources.....	15
Figure 6: Courses page demonstrating features	16
Figure 7: Social Login	22
Figure 8: Select Form.....	23
Figure 9: Introduction to Hyperledger Blockchain Course	25
Figure 10: INFINITECH Stakeholders Workshops Series: “Blockchain Applications for Digital Finance”	26
Figure 11: Courses Page	28
Figure 12: Workshops Page.....	29
Figure 13: Webinars Page.....	30
Figure 14: Accelerator Programmes Page	31
Figure 15: Assets Form	32
Figure 16: Course Form	33
Figure 17: Workshop Form.....	34
Figure 18: Webinar Form.....	35
Figure 19: Accelerator Programmes Form	36

List of Tables

Table 1: Assets	13
Table 2: Courses	17
Table 3: Workshops.....	19
Table 4: Webinars.....	19
Table 5: Accelerator Programmes.....	20

Abbreviations/Acronyms

Abbreviation	Definition
AI	Artificial Intelligence
IoT	Internet of Things
SMEs	Small and medium-sized enterprises
VDIH	Virtualized Digital Innovation Hub

1 Introduction

INFINITECH provides a complete integrated environment that allows the utilization of IoT, Blockchain, BigData and AI techniques in the finance and insurance sectors. This was made possible through a set of solutions and VDIH services to be exploited in a market platform that will support innovators (FinTech/InsuranceTech) in their endeavours, making it an entry-point to the innovation management services of the VDIH.

The INFINITECH Marketplace is a multi-sided platform that offers IoT, Blockchain, BigData and AI solutions and VDIH services for finance/ insurance. It is a public web-based environment that provides user registration and product/catalogue functionalities. All information is available to the public via login. Anyone can be part of this network, and as a INFINITECH user can consult but also contribute with information.

The INFINITECH Marketplace is available at:

<https://marketplace.infinitech-h2020.eu>

1.1 Objective of the Deliverable

The objective of this deliverable is to provide the updates made to the INFINITECH Marketplace front-end. The INFINITECH Marketplace is structured around 2 main building blocks, front-end and back-end, the end-users can interact with the Marketplace platform through the front-end, while other additional services can be implemented directly with the back-end.

With the evolution of information, the INFINITECH Marketplace was updated to support new content and more diversified information. As well as new features were added to allow the users to interact with the platform.

1.2 Insights from other Tasks and Deliverables

This deliverable is an evolution of the deliverable D8.2 “Market Platform and VDIH Specifications – II”, which is in turn an updated version of D8.1 “Market Platform and VDIH Specifications I”. Both focusing on the architecture and specifications of the INFINITECH Marketplace.

The INFINITECH Marketplace is the effort of two tasks, which are working together, T8.2 “BigData and AI Solutions Marketplace” and T8.3 “IoT and Blockchain Solutions Marketplace”. The tasks refer two Marketplaces, but the INFINITECH Marketplace has been realized as one solution that brings together IoT, Blockchain, BigData and AI solutions and VDIH services. A single Marketplace not only facilitates the access to information, but it also allows to create a larger community around the INFINITECH.

D8.5 (this deliverable) and D8.3 “BigData and AI Solutions Marketplace – I” are complementing each other, while the D8.5 focuses on updates to the INFINITECH Marketplace front-end, D8.3 focuses on updates to the back-end.

1.3 Structure of the Document

The rest of the deliverable is structured as follows:

- **Marketplace Front-end Update:** Contains an overview of updates to the INFINITECH Marketplace front-end, which includes updates in the structure itself, updates in existing pages, new pages created and new functionalities added.

- **Marketplace Usage Scenarios:** Contains scenarios that represent different approaches of INFINITECH Marketplace usage. The scenarios presented are just examples: user being an information consultant and an information provider.
- **Conclusions:** Description of the results obtained and next steps.
- **Appendix A -New PagesError! Reference source not found.:** Contains the pages of each VDIH content.
- **Appendix B -Marketplace Forms:** Contains the forms for the user to provide information to the INFINITECH Marketplace.

2 Marketplace Front-end Update

This chapter contains an overview of the updates and improvements to the INFINITECH Marketplace front-end. The structure initially defined was reorganized to accommodate the new content and facilitate the navigation within the INFINITECH Marketplace. New pages were created, and some existing ones were improved. This update also brought new functionalities to the INFINITECH Marketplace users.

The structure of the INFINITECH Marketplace was updated, the main update was in the VDIH page, previously named INFINITECH Academy. The name was changed to match the focus of the INFINITECH Marketplace that is “...establish a market platform that will provide access to the project’s solutions, along with a Virtualized Digital Innovation Hub (VDIH) that will support innovators (FinTech/InsuranceTech) in their BigData/ AI/IoT endeavors”. In the Figure 1 it is possible to see the current structure of the INFINITECH Marketplace.

The diversity among VDIH resources led to the organization of the page into Training Activities and Innovation Services. While Training Activities page includes courses, webinars and workshops, the Innovation Services page include the accelerator programmes. For each type of VDIH content was created a new page, which brings together all the resources present on the platform related to that content.

The updates aren’t restricted to the structure of the INFINITECH Marketplace, it was updated pages to support new functionalities and new pages was created to present new content, as will be explained through the chapter.

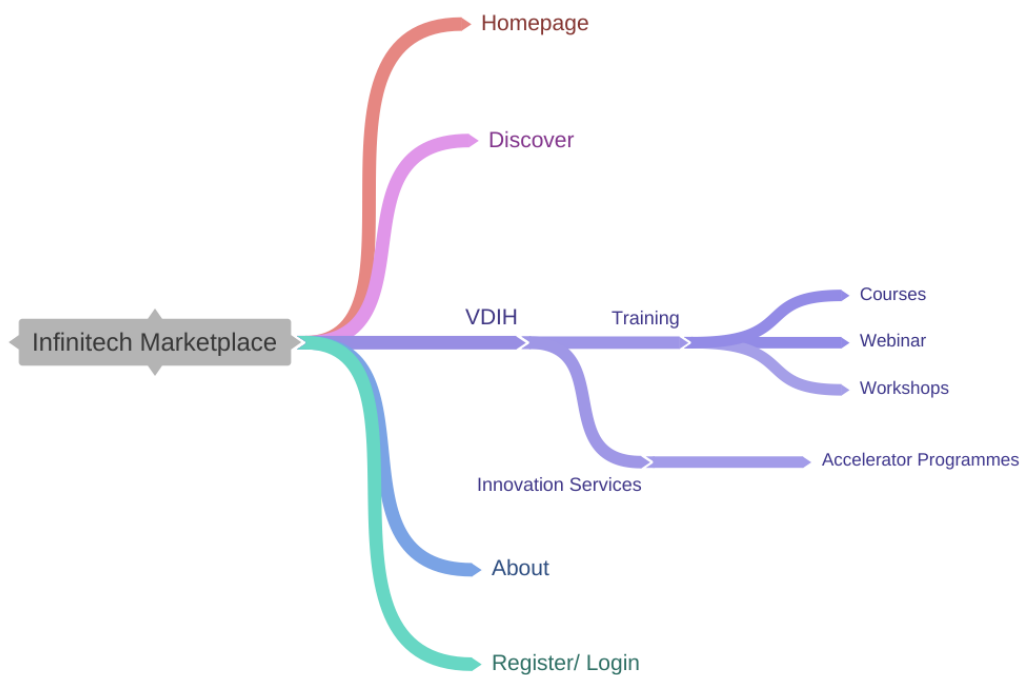


Figure 1: INFINITECH Marketplace Structure

2.1 Homepage

The Homepage (Figure 2) gives an overview of the INFINITECH Marketplace, in this sense it has been updated to include new resources and highlight new functionalities. This page is structured in different sections and currently provides:

- Statistics of all the resources available;
- Access to Infinittech Assets page;
- Access to Infinittech VDIH page;
- Access to new features.

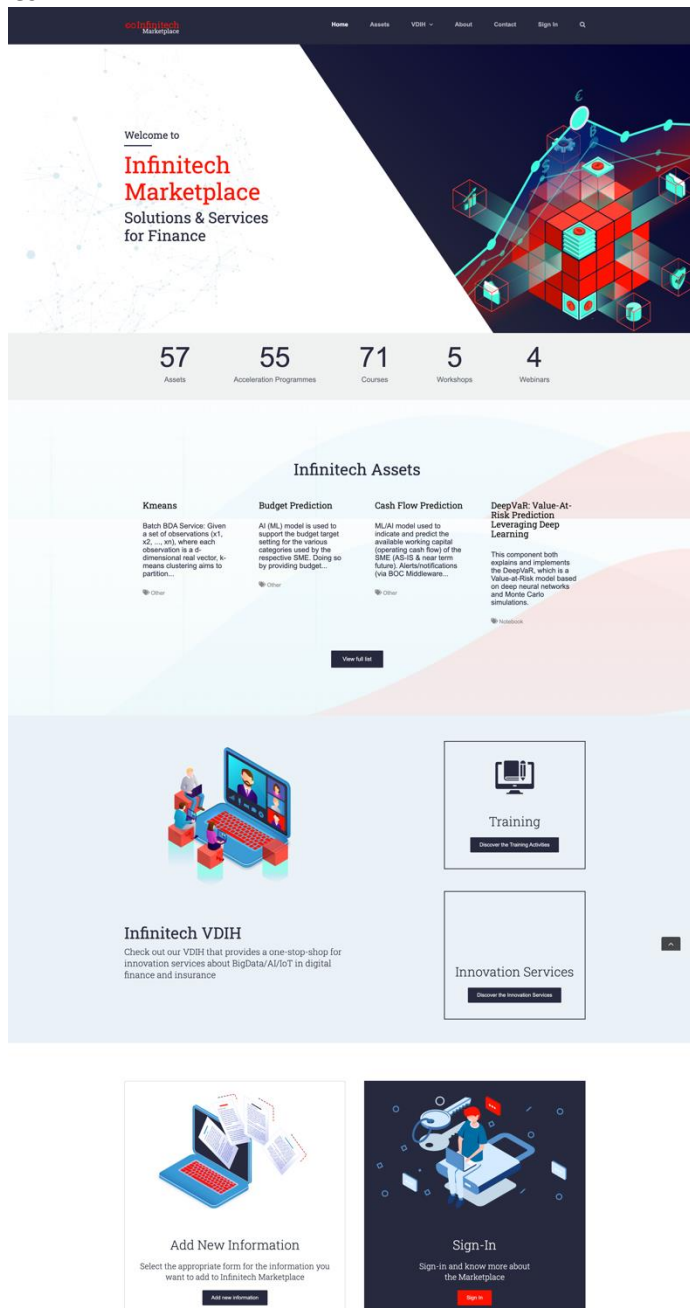


Figure 2: Homepage

The statistics show the type and the number of resources available on the platform. As it can be seen in the Figure 3, presently the INFINITECH Marketplace contain assets, courses, workshops and accelerator programmes, corresponding to a total of 192 resources.

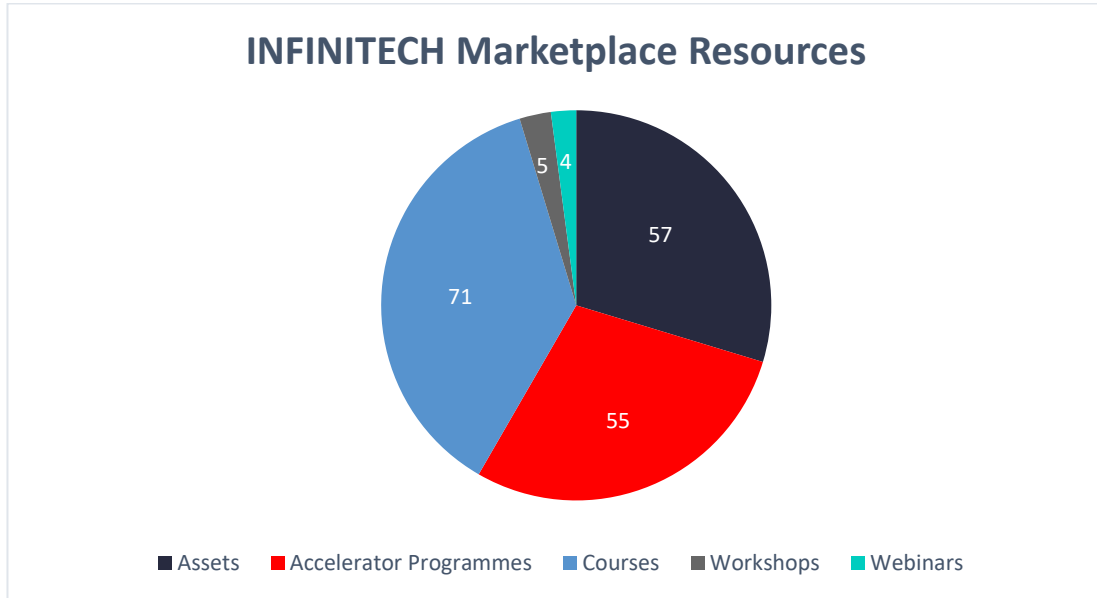


Figure 3: INFINITECH Marketplace Resources

The Infnitech Assets section provides access to the assets page and the Infnitech VDIH section provides access to Training Activities and Innovation Services. Both sections were visually updated, making it easier to access the resources.

The last section of the Homepage is dedicated to new functionalities and has been updated to highlight social login (Sign in) and forms (Add New Information). The forms allow the INFINITECH users to provide information to the platform. This new feature will be explained in the New Functionalities of Marketplace section.

2.2 Assets

The assets information becomes more varied and to deal with heterogeneity among assets the approach to collect and display information has been rethought. If before the asset structure was restricted to specific fields that followed an order, now it is more flexible to support different types of information, such as links, PDFs, videos, among others, but also to allow the information to tell a story.

Figure 4 shows an example of a custom structure, where the asset information includes resources (GitHub, docker and Swagger) with access to them via link, following a detail explanation of them, a Tutorial.

Financial Asset Recommender: Profitability Estimation

Owner: University of Glasgow

This is a supervised financial asset recommender service. It takes as input historical asset pricing data (weekly market closing prices) and for an asset and it predicts the annualized return on investment (i.e. profit %) for that asset. This is a publicly available containerized service. This component comes in two main flavors, namely: 1) a python jupyter notebook tutorial and 2) a containerized microservice with Rest API that can host a previously trained recommendation model. Typically new users should start with the python jupyter notebook tutorial as this will guide you through the process of training a recommendation model based on past data, and evaluating its performance. Users with already trained models can then try the microservice container for hosting the models that they have trained.

Category	Type	Field of Use
Recommender	Asset	Financial Services

Resources

- [GitHub](#) - Visit here
- [Docker](#) - Visit here
- [Swagger](#) - Visit here

Deploy in Tutorial Notebook Mode

The easiest way to get started with this service is to work through the python notebook tutorial included with the service. You can either work through the tutorial using a local Python Jupyter Server or Docker Compose, upload it to Google Colaboratory, or run it on your Kubernetes compute cluster, as described below:

Deploy Locally via Jupyter Notebook

To use the tutorial on your local machine, you will need to have a Python Jupyter server running locally. You can download and install Jupyter from [here](#). Once running, you can download the example notebook version of the Financial Asset Recommender (`FinancialAssetProfitabilityPrediction.ipynb`) and save it on your computer (right-click on the file and select "Save Link As..."). Then in a terminal (e.g. Bash for Linux, Terminal for MacOS or PowerShell for Windows) navigate in the folder that you downloaded the file to and run the following command:

Deploy Locally via Docker Compose

If you have a local installation of Docker (and Docker compose, typically installed with Docker) then you can also run the tutorial notebook using a pre-built Docker container with the notebook server and Python notebook. In this case, download the `docker-compose.yml` file from [this folder](#) (right-click on the file and select "Save Link As..."). Then in a terminal (e.g. Bash for Linux, Terminal for MacOS or PowerShell for Windows) navigate in the folder that you downloaded the file to and run the following command:

```
docker-compose up
```

You should then copy the link that will appear in the terminal (the one starting with `http://127.0.0.1:8888/...`) and paste it into your browser URL bar to navigate to the Jupyter Server UI, and open the tutorial notebook (`FinancialAssetProfitabilityPrediction.ipynb`) from there.

Deploy via Google Colabtratory

If you don't have Jupyter or Docker installed locally, or are using an old machine, then you can also run the notebook remotely via [Google's free Colaboratory Service](#). Colaboratory is simply a series of Jupyter servers running in Google's cloud infrastructure, which they make available for research and learning. You will first need to download a copy of the Financial Asset Recommender tutorial notebook and save it locally. You can get the notebook from [here](#) and save it on your computer (right-click on `FinancialAssetProfitabilityPrediction.ipynb` and select "Save Link As..."). Once that is done, open Colaboratory in your browser, sign with your Google account if you have not already done so, and you will reach a screen like this:

Click on the "Upload file, click 'Browse...' and select `FinancialAssetProfitabilityPrediction.ipynb` that you downloaded earlier. This should open the notebook in your browser, ready for you to work through it, where execution is performed on Google's remote servers.

Deploy via Google Colabtratory

Deploying the tutorial notebook server on an existing Kubernetes cluster is facilitated via a Helm Chart. This is a specification of the different Kubernetes objects that need to be created on the cluster for the service to function. You will first need to have Helm installed on the machine that you use to communicate with the Kubernetes cluster. This is an additional application that makes it easier to deploy and configure groups of Kubernetes objects that form an application. Instructions for installing Helm can be found [at the Helm Website](#).

Once Helm is installed, the next step is to download the Helm chart for the Financial Asset Recommender tutorial, which you can get from the associated [GitHub repository](#). In particular, on the machine that you use to communicate with the cluster and has Helm installed, clone the `git` repository:

```
git clone https://github.com/terrierteam/infintech-FAR-ProfitabilityEstimator.git
```

Next you need to make a small configuration change based on your Kubernetes cluster configuration. Kubernetes clusters are typically closed systems, i.e. services running in them are not visible to the outside world by default. The Helm chart provided will get around this limitation by creating a `Kubernetes Ingress object` that specifies a public endpoint that will allow `pass-through` access to the Jupyter server that runs the tutorial from the outside. However, to configure an ingress, we need to specify a unique hostname for the service that will be available to the cluster external endpoint. For example, if your cluster is running on a server at `http://mykubecuster.us-east-2.amazonaws.com`, then we might want `http://jupyter.mykubecuster.us-east-2.amazonaws.com` to point to the Jupyter notebook server. To configure this, you need to open up the `values.yaml` file in your cloned copy of the `git` repository in a text editor, then uncomment (delete the `#` in the `SS` and replace the text after the `host:` with your unique hostname for the service (i.e. your equivalent to `http://jupyter.mykubecuster.us-east-2.amazonaws.com`), then save the file. Once done, in a terminal (e.g. Bash for Linux, Terminal for MacOS or PowerShell for Windows), navigate to the cloned `git` repository root:

```
helm install infintech-far-fe ./kubernetes/infintech-far-fe --namespace mykubenamepace
```

Where `mykubenamepace` should be replaced with the `namespace` within your `Kubernetes cluster` you want the application to be installed into. This will start the service running on your Kubernetes cluster. You can then access the notebook by entering the unique hostname you specified earlier into a web browser. You can also remove the `rest API` service once you are finished with it as:

```
helm uninstall infintech-far-fe --namespace mykubenamepace
```

Deploy as Containerized Microservice

The tutorial notebook discussed above walks you through the process of downloading timeseries financial data, preparing and then training an asset recommendation model based on that data. However, often we want to use the trained model within a larger application. This is supported by hosting a containerized service that exposes a `RESTful API` end-point that uses the resultant model to produce recommendations on-demand for specified assets or by providing the needed time-series features to make a prediction for a previously unseen asset. The specification for this API can be found [here](#). Once you have a model trained, you can deploy the model as a microservice on Kubernetes cluster. However, note that you will have needed to store the trained model within a persistent storage volume that can be subsequently mounted to the API service container (so it can access your model).

Deploy via Kubernetes Cluster

Deploying the tutorial notebook server on an existing Kubernetes cluster is facilitated via a Helm Chart. This is a specification of the different Kubernetes objects that need to be created on the cluster for the service to function. You will first need to have Helm installed on the machine that you use to communicate with the Kubernetes cluster. This is an additional application that makes it easier to deploy and configure groups of Kubernetes objects that form an application. Instructions for installing Helm can be found [at the Helm Website](#).

Once Helm is installed, the next step is to download the Helm chart for the Financial Asset Recommender tutorial, which you can get from the associated [GitHub repository](#). In particular, on the machine that you use to communicate with the cluster and has Helm installed, clone the `git` repository:

```
git clone https://github.com/terrierteam/infintech-FAR-ProfitabilityEstimator.git
```

Next you need to configure the deployment to specify where the service should obtain the trained recommendation model and list of assets from. To configure this, you need to open up the `values.yaml` file in your cloned copy of the `git` repository in a text editor, then edit the first two entries, `modelLocation` and `assetListLocation`. By default these will load example models from a Google Drive folder. Once done, in a terminal (e.g. Bash for Linux, Terminal for MacOS or PowerShell for Windows), navigate to the cloned `git` repository root:

```
helm install infintech-far-fe ./kubernetes/infintech-far-fe --namespace mykubenamepace
```

Where `mykubenamepace` should be replaced with the `namespace` within your `Kubernetes cluster` you want the application to be installed into. This will start the application running on your Kubernetes cluster. As part of the helm chart a service object will be created with the name `infintech-far-fe` where `fe` is replaced with a generated number for the deployment. You can send `API requests` via this service on port 80. You can also remove the `rest API` service once you are finished with it as:

```
helm uninstall infintech-far-fe --namespace mykubenamepace
```

Figure 4: Financial Asset Recommender: Profitability Estimation

Table 1 provides the names and respective link (to the INFINITECH Marketplace page) of all assets available so far on the platform, which correspond a total of 57 resources.

Table 1: Assets

Assets	Link
Anomaly Analysis	link
Anonymized Customer Banking Data Datasets	link
Benchmark(s)	link
Blockchain Authenticator	link
Blockchain Data Visualizer	link
Blockchain Decryptor	link
Blockchain Encryptor	link
Blockchain Reader	link
Blockchain Transaction Dataset Preparation Component	link
Blockchain Writer	link
Budget Prediction	link
Cash Flow Prediction	link
Data Collection component	link
DPO (Data Protection Orchestrator)	link
DUOS (Digital User On-boarding Services)	link
EASIER-AI	link
Filtering	link
Fraud Detection Model	link
Fraud Detection Service Execution	link
Fraud Detection Service Training	link
Health insurance fraud detection service	link
Health insurance risk assessment service	link
Incremental Analytics	link
Invoice Processing	link
IoT Agent (no longer need, because is part of SmartFleet Platform)	link
Joiner	link
Kmeans	link
KPI Engine	link
OneHotEncoder	link
Open API Gateway	link
Pattern Analysis	link
Pay As You Drive Model	link

Assets	Link
Pay As You Drive Service Execution	link
Pay As You Drive Service Training	link
Random Forest (Model)	link
Random Forest (Predict)	link
Real Time Visualization	link
Recommender	link
Scalable Transaction Graph Analysis Component	link
Simulated Vehicles Data Set	link
Smart Contract Executor	link
SmartFleet Platform: IoT Context Management and Historical data component	link
SPeIDI (Service Provider eIDAS Integration)	link
Stream Story	link
Synthetic RWD for well-being analytics	link
Transaction (Txn) Categorization	link
Transaction (Txn) Monitoring	link
User Interface for Blockchain Transaction Reports and Visualization Component	link
Vehicles Data Set (Vigo)	link
Visualization Preparation	link
Well-being outlook classifiers	link

2.3 VDIH

As mentioned previously, the INFINITECH Academy page has been reformulated to accommodate the new content, it is currently the VDIH page. The name has been changed to match the focus of the INFINITECH Marketplace. The page also was organized into Training Activities and Innovation Services, while the Training Activities include courses, workshops and webinars, the Innovation Services includes acceleration programmes. Accelerator programmes are services to support and guide startups and SMEs on the creation of innovation through experts advisory, co-working space, education and skills development, among others.

As presented in Figure 5, the INFINITECH Marketplace currently has a total of 135 VDIH resources, which correspond to courses, workshops, webinar and accelerator programmes.

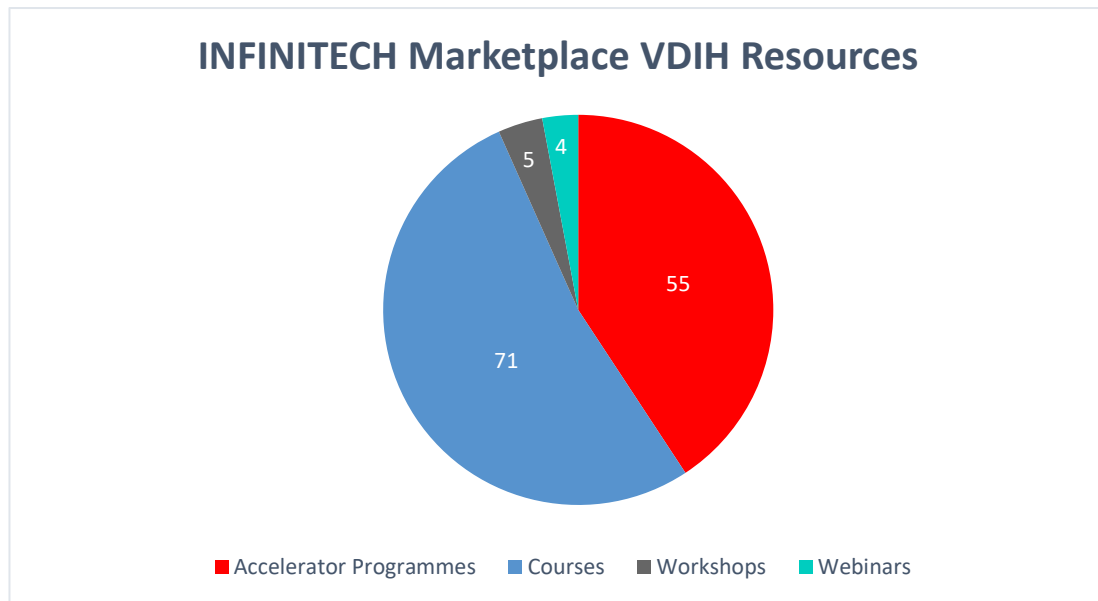


Figure 5: INFINITECH Marketplace VDIH Resources

All VDIH content pages are similar and Figure 6 shows the Courses page as a demonstration of these pages. The VDIH pages provide all the resources available on the platform related to that type of content, as well as provide some features for the user:

1. **Filter by source:** It allows to differentiate the source of the resources, if it belongs to INFINITECH partners or external entities, through the options: ALL, INFINITECH Course (in the case of the demonstration) or External.
2. **Red Flag with the INFINITECH symbol:** Related with the filter, it allows to differentiate the source of the resources, highlighting the resources which belongs to INFINITECH partners.
3. **Add new resource:** In this case, appear “Add new course”, the button gives access to the course form. Each VDIH as its own form that allows the INFINITECH users to provide information. This feature will be explained in the New Functionalities of Marketplace section.

Appendix A - New Pages provides information on all the VDIH content, which will be identified and described throughout the following subsections.

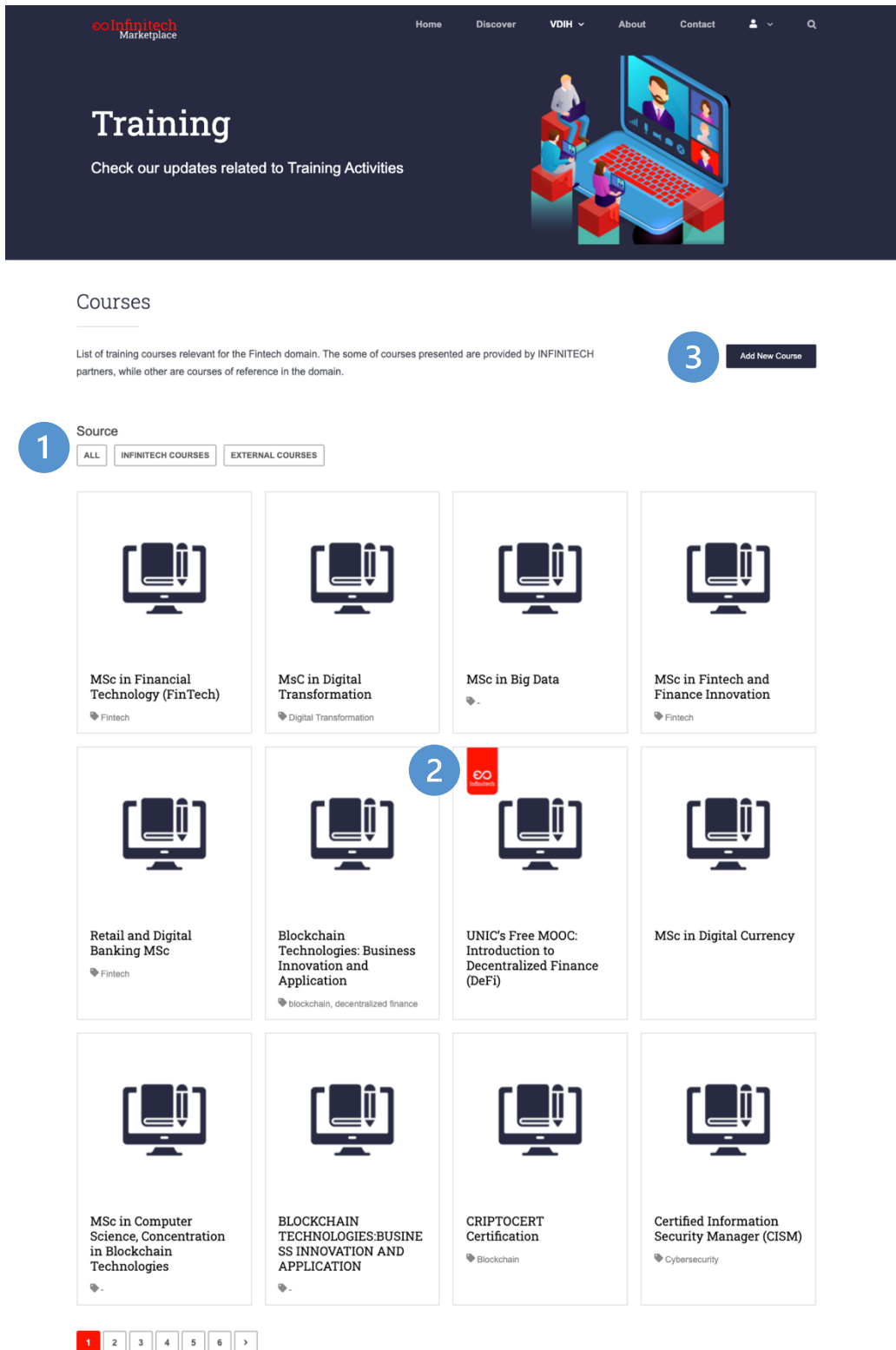


Figure 6: Courses page demonstrating features

2.3.1 Training Activities

The INFINITECH Marketplace is a network with relevant resources about IoT, Blockchain, BigData and AI for finance/ insurance. Training Activities is a new page of this network with a variety of courses, workshops and webinars that offer INFINITECH users the opportunity to improve their skills, knowledge or expertise.

2.3.1.1 Courses

The Courses page (Figure 11) list all the courses available on the INFINITECH Marketplace. Each course has its own page, with information that characterizes it, such a brief description, who provided the course, difficult level, duration, cost, platform where the course will be available, among others. In addition to, the user also can know more about the course through the website present on the page.

Table 2 shows all courses available on the INFINITECH Marketplace so far, a total of 71 VDIH resources.

Table 2: Courses

Courses	Link
MSc in Blockchain and Digital Currency	link
UNIC's Free MOOC: Introduction to Digital Currencies	link
MSc in Computer Science, Concentration in Blockchain Technologies	link
Digital Transformation in Financial Services Specialization	link
Innovation Strategy: Developing Your Fintech strategy	link
Future Development in Supply Chain Finance and Blockchain Technology	link
Machine Learning and Reinforcement Learning in Finance Specialization	link
FinTech: Finance Industry Transformation and Regulation Specialization	link
Using Machine Learning in Trading and Finance	link
Reinforcement Learning in Finance	link
Fundamentals of Machine Learning in Finance	link
Overview of Advanced Methods of Reinforcement Learning in Finance	link
Supply Chain Finance and Blockchain Technology Specialization	link
Blockchain, Cryptoassets, and Decentralized Finance	link
Introduction to Blockchain for Financial Services	link
Blockchain Transformations of Financial Services	link
Blockchain Revolution Specialization	link
Digital transformation-Finance-Strategies	link
Open Banking, PSD2 and GDPR. FinTech	link
Finance and Accounting in the Digital Age	link
Artificial Intelligence for Finance, Accounting & Auditing	link
Complete 2-in-1 Python for Business and Finance Bootcamp	link
Practical Machine Learning: Real World Projects In Finance	link
AI for Finance	link
Mastering FinTech and Machine Learning!	link
Machine Learning Practical: Real World Projects In Finance	link
FinTech – Prepare for the revolution in Finance	link
Blockchain For Business+Finance Professionals 2019 – NEW	link

Courses	Link
Blockchain In Banking Industry & Enterprise Application	link
AI and Blockchain: A Disruptive Integration	link
Introduction to FinTech	link
Fintech: Blockchain for Business and Finance	link
Fintech: AI & Machine Learning in the Financial Industry	link
Deep Learning and Neural Networks for Financial Engineering	link
FinTech Ethics and Risks	link
Classical Machine Learning for Financial Engineering	link
Fintech: Overview of the Fintech Sector	link
Blockchain and FinTech: Basics, Applications, and Limitations	link
Introduction to Hyperledger Blockchain Technologies	link
Blockchain: Understanding Its Uses and Implications	link
Blockchain Technologies: Business Innovation and Application	link
UNIC's Free MOOC: Introduction to Decentralized Finance (DeFi)	link
MSc Financial Technology	link
Master in Financial Technology and Computing	link
EIT Digital Master School	link
Master in FinTech & Business Analytics EADA – ISDI	link
Data Strategy Executive Program	link
eBusines Executive Program	link
MSc in Digital Transformation	link
Fintech program	link
MSc in IoT & Data Science	link
IoT Executive Program	link
MSc in Data Science & Analytics	link
MSc in Business Analytics	link
MSc in Data Science & Deep Learning	link
IT/OT Security Awareness Training	link
High-quality training for computer security teams I	link
High-quality training for computer security teams II	link
BsC Business Information Technology	link
PhD Winter School	link
Embedded Security Engineering	link
Digitalization of Finance	link

Courses	Link
Certified Information Security Manager (CISM)	link
CRIPTOCERT Certification	link
MSc in Big Data	link
BLOCKCHAIN TECHNOLOGIES:BUSINESS INNOVATION AND APPLICATION	link
MSc in Computer Science, Concentration in Blockchain Technologies	link
MSc in Digital Currency	link
Retail and Digital Banking MSc	link
MSc in Fintech and Finance Innovation	link
MSc in Financial Technology (FinTech)	link

2.3.1.2 Workshops

The workshops page (Figure 12) list all the workshops present on the INFINITECH Marketplace. Each workshop has its own page, with information that characterizes it, such a brief description, duration, who are the speakers, presentation files, videos and more like it can be viewed in figure.

Table 3 lists all workshops available on the INFINITECH Marketplace to date, being a total of 5 VDIH resources.

Table 3: Workshops

Workshops	Link
Decentralized Finance (DeFi) Webinar: Where do we stand and where do we go?	link
INFINITECH Stakeholders Workshop Series: “BigData and Artificial Intelligence for Portfolio Risk Assessment”	link
INFINITECH Stakeholders Workshops Series: “Artificial Intelligence and Big Data analytics applied to Personalised, Usage Based and Configurable Insurance Products”	link
INFINITECH Stakeholders Workshops Series: “Blockchain Applications for Digital Finance”	link
INFINITECH Stakeholders Workshops Series: “Risk Profiling and Portfolio Optimization for broader Use Cases”	link

2.3.1.3 Webinars

The Webinars page (Figure 13) brings together all the webinars available on the INFINITECH Marketplace. Each webinar has its own page, with some information that characterizes it, such as a brief description, date, organizer, as well as additional files and videos.

Table 4 lists all the webinars present on the INFINITECH Marketplace so far, making a total of 4 VDIH resources.

Table 4: Webinars

Webinars	Link
Blockchain-enabled Consent Management	link
ERC1155 Token Smart Contract for Hyperledger	link
KYC/KYB On-Chain Data Governance	link

Webinars	Link
Tokenization on Hyperledger Fabric -ERC20 chaincode	link

2.3.2 Innovation Services

Innovation Services page was added to the INFINITECH Marketplace network and that's where we can find accelerator programmes information. The Innovation Services intends to be a page where the user can find content to get support to a self-determined and sustainable approach to digital pioneering and help to accelerate businesses and guide it into the future to achieve better results.

2.3.2.1 Accelerator Programmes

The Accelerator Programmes page (Figure 14) brings together all the accelerator programmes existent on the INFINITECH Marketplace. Each accelerator programme has its own page, with some information that characterizes it, such as the services that provide and who are the beneficiaries of these services, as well the methodology, sector, among others. In addition to, the user can know more about the service through the website available on the page.

Table 5 provides information on the accelerator programmes available on the INFINITECH Marketplace to date, a total of 55 VDIH resources.

Table 5: Accelerator Programmes

Accelerator Programmes	Link
Distributed Ledgers Research Centre (DLRC)	link
Gravity Ventures Incubator	link
Wayra	link
Visa Innovation Program	link
University of Valencia Science Park DIH	link
TVT Innovation – Pôle Mer Méditerranée	link
The LHoFT	link
Sunrise Valley Digital Innovation Hub (SV DIH)	link
StartupUtrecht	link
Startup Palace	link
Start-up Nation Central	link
Start-up garage	link
SmartCityTech	link
Seedrocket	link
Santaka Artificial Intelligence DIH	link
Portugal Fintech	link
Plug and Play	link
Nyuko a.s.b.l.	link
Novel-T	link

Accelerator Programmes	Link
Madeira Digital Innovation HUB	link
Luxinnovation	link
Le Pool French Tech Rennes St Malo	link
Lanzadera	link
IoT DIH	link
IRIS: European Digital Innovation Hub Navarra	link
AddedValue	link
Intelligent Urban Lab	link
INFOBALT DIH	link
Hub 612	link
Holland Fintech	link
Hellenic Blockchain Hub	link
Greek Fintech Hub	link
Frankfurt School Blockchain Center (FSBC) at the Frankfurt School of Finance & Management gGmbH (FS)	link
FinTech Scotland	link
FinTech Innovation Hub Bank of Greece	link
Fintech District	link
Fintech Cluster	link
Fintech Aviv	link
Espaitec Science and Technology Park	link
Emprende UP	link
DigitalNorway	link
DIGIHALL	link
Cybersecurity Innovation HUB	link
CUATRECASAS ACELERA	link
Conector	link
Centre Val de Loire Digital Innovation Hub	link
Bridgeway Europe Startup Accelerator, Bridgeway Accelerator	link
BlackFin Tech	link
Bboster	link
AIR4S – Artificial Intelligence & Robotics for Sustainable Development Goals	link
AI4GALICIA: Artificial Intelligence for Galicia	link
Accelerator Frankfurt	link
Emerging Transactional and Financial Technology Hub (ETFTH)	link

Accelerator Programmes	Link
Insomnia	link
Copenhagen Fintech	link

2.4 New Functionalities of Marketplace

In order to create community around the INFINITECH Marketplace and enrich it with new information, the following functionalities were added to allow the users interact with the platform:

- Social Login: The registration process was simplified and facilitated.
- Add new information: Any INFINITECH user can provide information.

2.4.1 Social Login

One of the objectives of the INFINITECH is to create a digital finance ecosystem of innovation, with IoT, Blockchain, BigData and AI solutions and services. For this purpose, the Social Login was implemented in the INFINITECH Marketplace to connect the stakeholders and expand the INFINITECH community being an entry point for the community to access and provide information.

The Social login offers a simplified, quick, and easy registration, helping the users to sign-up on a third-party platform using their existing login information from social media networks, like Google, LinkedIn, and GitHub (Figure 7).

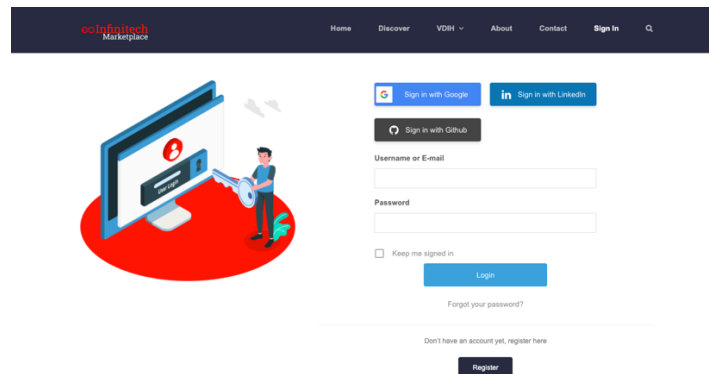


Figure 7: Social Login

2.4.2 Add New Information

In order to enrich the digital finance ecosystem of innovation, it was created forms to give the users the opportunity to share their solutions and services on the INFINITECH Marketplace, because it is important that information continues to evolve and increase.

Anyone can be part of this community, by registering, and as a INFINITECH user it is possible to provide information to the INFINITECH Marketplace. The users have different forms available, depending on the content they want to add (assets, courses, workshops, webinars, and accelerator programmes).

Through the Homepage the users can access all the forms available in a single place (Figure 8) or go through the respective content page (Appendix B -Marketplace Forms).

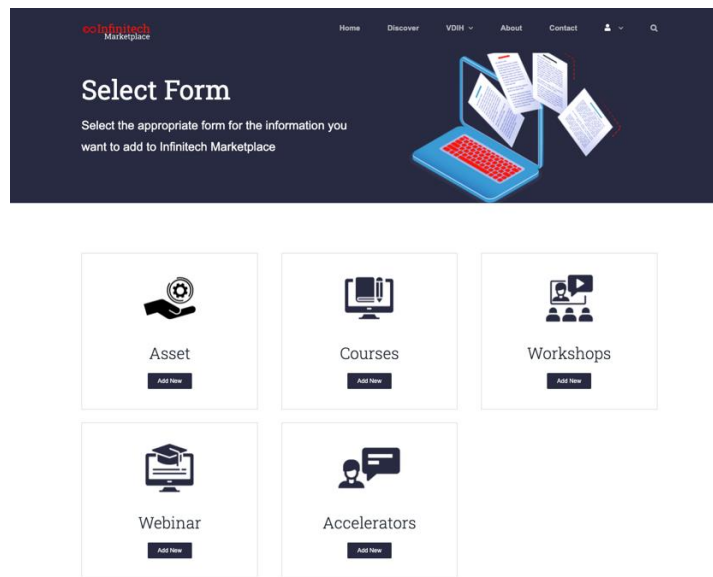


Figure 8: Select Form

3 Marketplace Usage Scenarios

The INFINITECH Marketplace is a good source of information, where can be found solutions and services about IoT, AI, Blockchain and BigData in context of finance/ insurance. It is very important to enrich the information available and for this the users will be capable to provide information, but also to take advantage of it.

So, this means, that can be seen from 2 perspectives, the user as an information provider and the user as information consumer. Both perspectives can be explored through the following scenarios that represent examples of the INFINITECH Marketplace usage:

- Scenario 1: A user who want add information to the INFINITECH Marketplace.
- Scenario 2: A user who want to know more about workshops in the finance domain.

3.1.1 Scenario 1: Upload a VDIH

Scenario 1 represents a user who want provide information to the INFINITECH Marketplace. For example, to upload a blockchain Course. For this, the user needs to follow a few steps:

- **Step A:** [Sign in](#).
 - **Step A1:** If the user isn't registered, they will have to [register](#) first and then they will be able to login.
- **Step B:** Access to the form, which can be done through:
 - **Step B1:** [Homepage](#), which gives access to all available forms.
 - **Step B2:** [VDIH page](#), which is organized in "Training" and "Innovation Services". The user must go through Training to access the [Courses page](#) and select "Add New Course".
- **Step C:** Fill in the [Course form](#). The first fields of the form refer to the provider (Your Information) and the other to the Course (Course Information). Some fields are mandatory, those that are identified with a *.
- **Step D:** When submitting the information, it is moderated by the consortium.
- **Step E:** The Course is published on the INFINITECH Marketplace.

Figure 9 show the aspect of a Course which was added to the INFINITECH Marketplace through Course form.

Home / Training Services / Introduction to Hyperledger Blockchain Technologies

Introduction to Hyperledger Blockchain Technologies

Website Available [here](#)

Discover the power of business blockchains and distributed ledger technologies with an overview of Hyperledger and its key frameworks. All over the global market there are ledgers that organizations and individuals alike must trust. Blockchain technologies record promises, trades, transactions or simply items we never want to disappear, allowing everyone in an ecosystem to keep a copy of the common system of record.

This introductory course is carefully curated for nontechnical, business-oriented audiences. It examines blockchains for the enterprise and a number of pertinent use cases from Hyperledger, a global cross-industry community of communities hosted by The Linux Foundation and advancing business blockchain technologies. Hyperledger is incubating and promoting enterprise grade, open source business blockchain software, on top of which anyone can set up apps to meet cross-industry needs.

The course covers key features of blockchain technologies and the differentiators between various types of Hyperledger projects. We'll start with 'what is blockchain' and open the discussion to identifying suitable blockchain use cases for your business requirements. We will then take a deeper dive into the enterprise-ready Hyperledger blockchain technologies: distributed ledger frameworks, domain-specific, tools and libraries.

Students will gain an understanding of how blockchains work and how they can create value for their business through cost-savings and efficiencies, in terms of speed and simplicity. They will view how information is generated, stored, and shared in various blockchains, as well as gain tools to evaluate whether or not a blockchain solution would be suitable for their particular business case.

Industries today are using blockchain technologies to increase efficiency and solve business problems associated with data privacy, security, information sharing, and inclusion. Be on the cutting edge; learn about these innovative technologies and bring unique value to your business.

Keywords
blockchain, distributed ledgers, Hyperledger technologies

Provided by	Level	Duration	Cost	Platform
The Linux Foundation	beginner	2-4h x 10 weeks	163€	edX

Figure 9: Introduction to Hyperledger Blockchain Course

3.1.2 Scenario 2: Consult a VDIH

Scenario 2 represents a user that want to know more about blockchain Workshops in finance domain. The INFINITECH Marketplace has a VDIH section and in this section, the user can consult Workshops, but also other types of content are available about IoT, Blockchain, BigData, AI for finance and insurance (Courses, Webinars and Accelerator Programmes).

On the Workshops page the user can get an idea of the information present on the platform through the names of the workshops and start by selecting one that seems to be of interest to him. On the respective workshop page, the user can find out more about the workshop, exploring the description and the agenda, among other additional information, and only follow the parts that fit their interests. The user can manage their time and later consult the presentation files that are available online.

To obtain more detailed information the user can contact the consortium and receive all the information that needs. Figure 10 represents an example of Workshops available at the INFINITECH Marketplace and we can see the sections it was mentioned before.

INFINITECH Stakeholders Workshops Series: "Blockchain Applications for Digital Finance"
 Published On: March 4th, 2021

INFINITECH Stakeholders Workshops Series - "Blockchain Applications for Digital Finance" Session 1

INFINITECH Stakeholders Workshops Series - "Blockchain Applications for Digital Finance" Session 2

MORE INFORMATION

Speakers

- John Soldatos, INNOV-ACTS LTD.
- Dimitris Miliadou, UBITECH S.A.
- Fabiana Fournier, IBM Israel
- Nikos Kapsoulis, INNOV-ACTS LTD.
- Alper Sen, Bogazici University.

Description

Agenda

"Blockchain Applications for Digital Finance"
 Innovative Blockchain Applications for Finance beyond Cryptocurrencies

Session 1: Blockchain Applications Presentations and Demonstrators

10:00 – 10:10: "Overview of Blockchain Applications in the Finance Sector – Workshop Overview", John Soldatos
 10:10 – 10:30: "Decentralized Management of Consent in Finance Applications", Dimitris Miliadou, UBITECH S.A.
 10:30 – 10:50: "Empowering Digital Finance Innovation with Blockchain Tokenization", Fabiana Fournier, IBM Israel
 10:50 – 10:55: Break
 10:55 – 11:15: "Know Your Customer (KYC): A Blockchain Based Implementation", Nikos Kapsoulis, INNOV-ACTS LTD
 11:15 – 11:35: "Analysing Blockchain Transaction Graphs for Fraudulent Activities", Alper Sen, Bogazici University
 11:35 – 11:40: Break

Session 2: Open Discussion and Stakeholders Feedback

11:40 – 11:50: Open Questions and Answers Session – (Questions from the Audience)
 11:50 – 11:55: Guided Feedback – Questionnaires Filling (All Participants)
 11:55 – 12:00: Meeting Close & Conclusions

Who should attend?

- INFINITECH Partners working on Blockchain Applications and Demonstrators.
- INFINITECH Banking Partners and FinTechs.
- Employees of Banks and Financial Institutions.
- Blockchain Experts and Consultants.
- Integrators of Blockchain Solutions.

Duration

2h

Presentations:

1. Overview of Blockchain Applications in the Finance Sector – Workshop Overview
2. Decentralized Management of Consent in Finance Applications
3. Empowering Digital Finance Innovation with Blockchain Tokenization
4. Know Your Customer (KYC): A Blockchain Based Implementation
5. Analysing Blockchain Transaction Graphs for Fraudulent Activities

CONTACT

Want to know more about this Workshop? Contact us and receive all the details

[Click here](#)

Figure 10: INFINITECH Stakeholders Workshops Series: "Blockchain Applications for Digital Finance"

4 Conclusions

This document gives an overview of the updates to the INFINITECH Marketplace front-end. The updates to the back-end are inputs to the deliverable D8.3.

One of the objectives of the project is to develop marketplaces for IoT/ Blockchain and BigData/ AI solutions as part of the multi-side market platform and VDIH. For that purpose, in order to facilitate the access to information, but also to create a large community around the INFINITECH, the INFINITECH Marketplace was created as one solution that brings together all the solutions and VDIH services regarding the project. The INFINITECH Marketplace front-end offers the users the entire core of IoT, Blockchain, BigData and AI solutions and VDIH services for finance/ insurance in a single place (available [here](#)).

The information provided by the INFINITECH partners evolved, becomes more diversified and heterogeneous. To deal with this challenge, the structure of the INFINITECH Marketplace was updated to accommodate the new content (courses, webinars, workshops and accelerator programmes). The INFINITECH Academy was renamed VDIH to match with the focus of the INFINITECH Marketplace and was organized by Training Activities, that include courses, webinars and workshops, and Innovation Services, that includes accelerator programmes. For the other hand, to support the heterogeneity among assets, the INFINITECH Marketplace gives the possibility to customize the asset layout, allowing to display more varied information.

To promote the growth of the INFINITECH Marketplace community, the registration process was simplified and facilitated with the implementation of the social login. The user can register using the identity already created in a social network (Google, LinkedIn, or GitHub). Once registered, the user can provide information to the INFINITECH marketplace network. For this, a set of forms were created and can be easily found on the platform.

The users can interact with the INFINITECH Marketplace by consulting the available information but also providing information. At the moment of the submission of the deliverable the current status of the resources available corresponds to a total of 192, which is the sum of the following content:

- 57 Assets
- 55 Accelerator Programmes
- 71 Courses
- 5 Workshops
- 4 Webinars

Regarding next steps, the focus will be on further updates of the front-end building block of the INFINITECH marketplace, while also including new components to support new types of information (assets, training activities and innovation services).

Appendix A - New Pages

The section provides an overview of the new INFINITECH Marketplace pages:

- Courses
- Workshops
- Webinars
- Accelerator Programmes

Courses Page

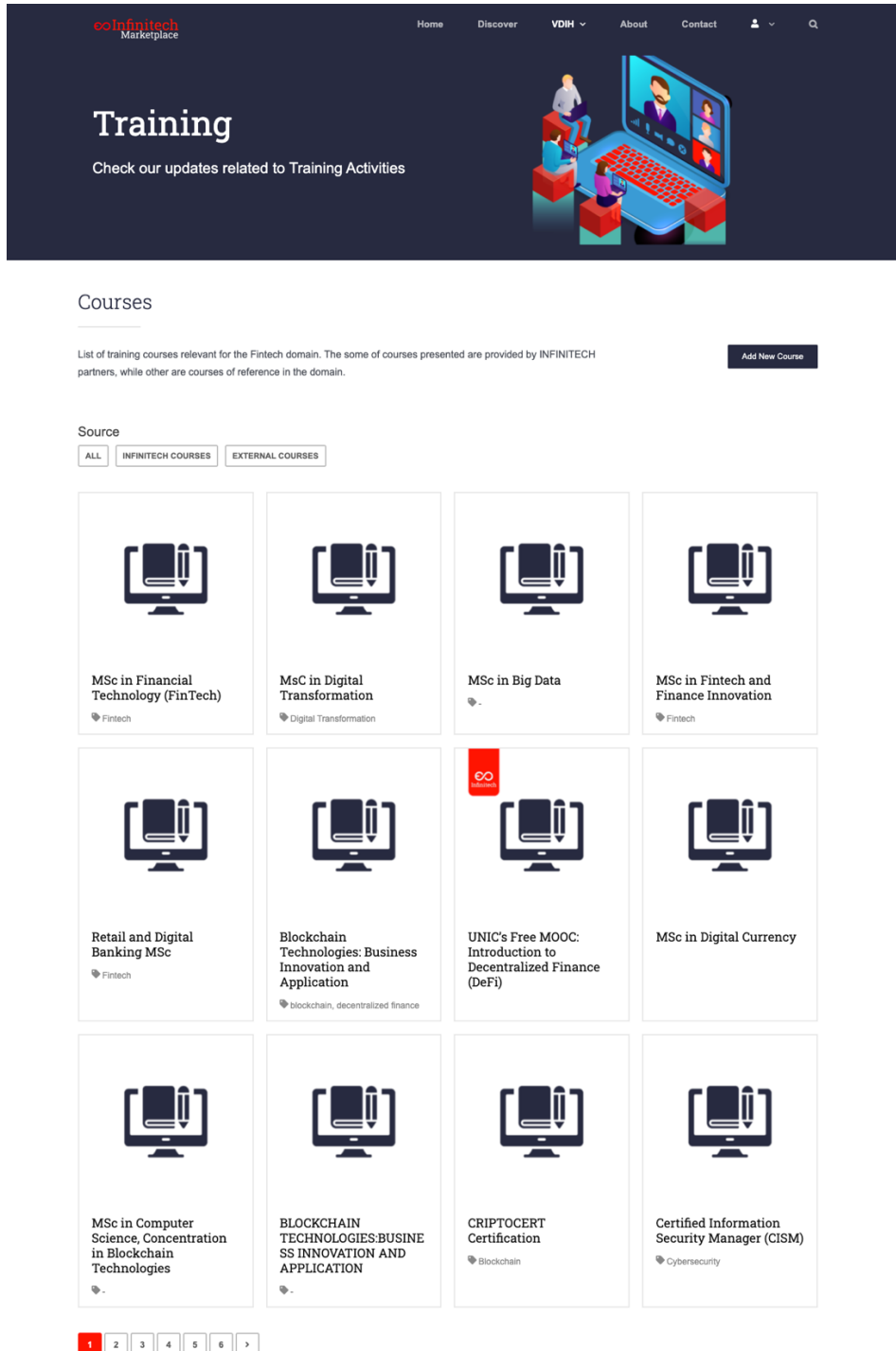


Figure 11: Courses Page

Workshops Page

The screenshot shows the 'Training' section of the INFINITECH Marketplace. At the top, there is a navigation bar with links for Home, Discover, VOIH, About, Contact, Sign In, and a search icon. Below the navigation bar is a large banner with the word 'Training' and the text 'Check our updates related to Training Activities'. To the right of the banner is an illustration of a person sitting at a desk with a laptop, and a large screen displaying a video conference with three participants. Below the banner, the section is titled 'Workshops' and includes a sub-header 'List of Workshops presented by INFINITECH members' and an 'Add New Workshop' button. Underneath, there are filter buttons for 'Source', including 'ALL', 'INFINITECH WORKSHOPS', and 'EXTERNAL WORKSHOPS'. The main content area displays five workshop cards. Each card features the INFINITECH logo, an icon of a person at a computer with a play button, and a list of workshop titles and topics. The workshops are: 1. 'INFINITECH Stakeholders Workshops Series: "Risk Profiling and Portfolio Optimization for broader Use Cases"' with topics: Market Sentiment Data Tool, Portfolio Management, Portfolio Optimization, Workshop. 2. 'INFINITECH Stakeholders Workshops Series: "Artificial Intelligence and Big Data analytics applied to Personalised, Usage Based and Configurable Insurance Products"' with topics: Agro Insurance, Big Data, Infnitech Project, Risk Assessment, SMEs. 3. 'INFINITECH Stakeholders Workshop Series: "BigData and Artificial Intelligence for Portfolio Risk Assessment"' with topics: Artificial Intelligence, Big Data, Infnitech, Risk Assessment, Workshop. 4. 'INFINITECH Stakeholders Workshops Series: "Blockchain Applications for Digital Finance"' with topics: Blockchain Applications, Digital Finances, Workshop. 5. 'Decentralized Finance (DeFi) Webinar: Where do we stand and where do we go?'

Figure 12: Workshops Page

Webinars Page

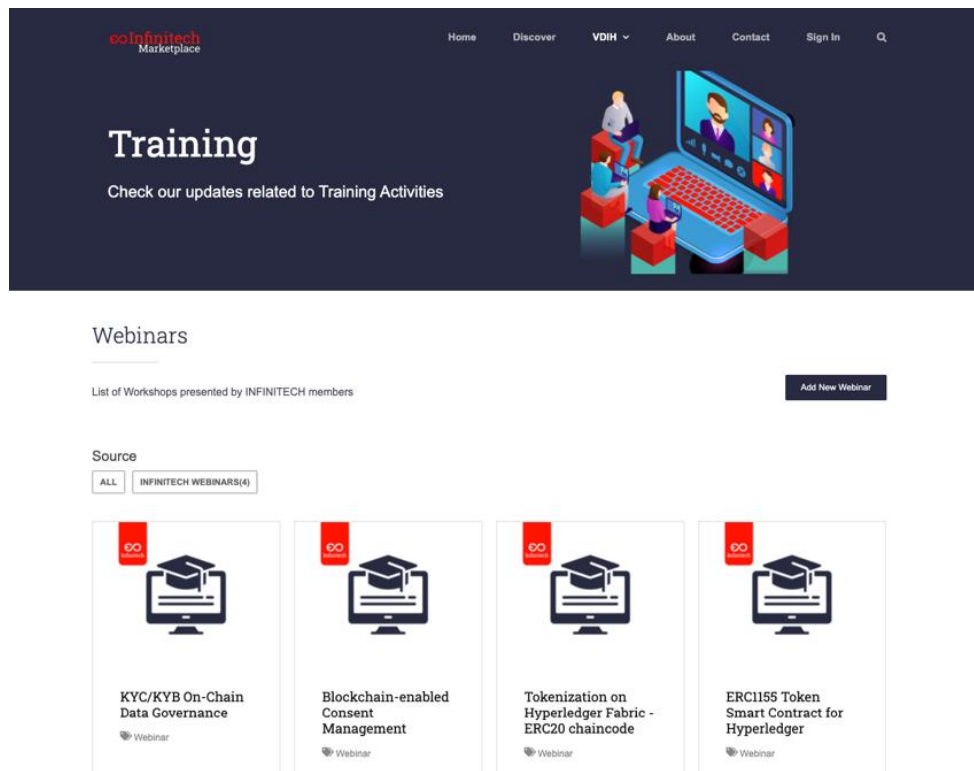


Figure 13: Webinars Page

Accelerator Programmes Page

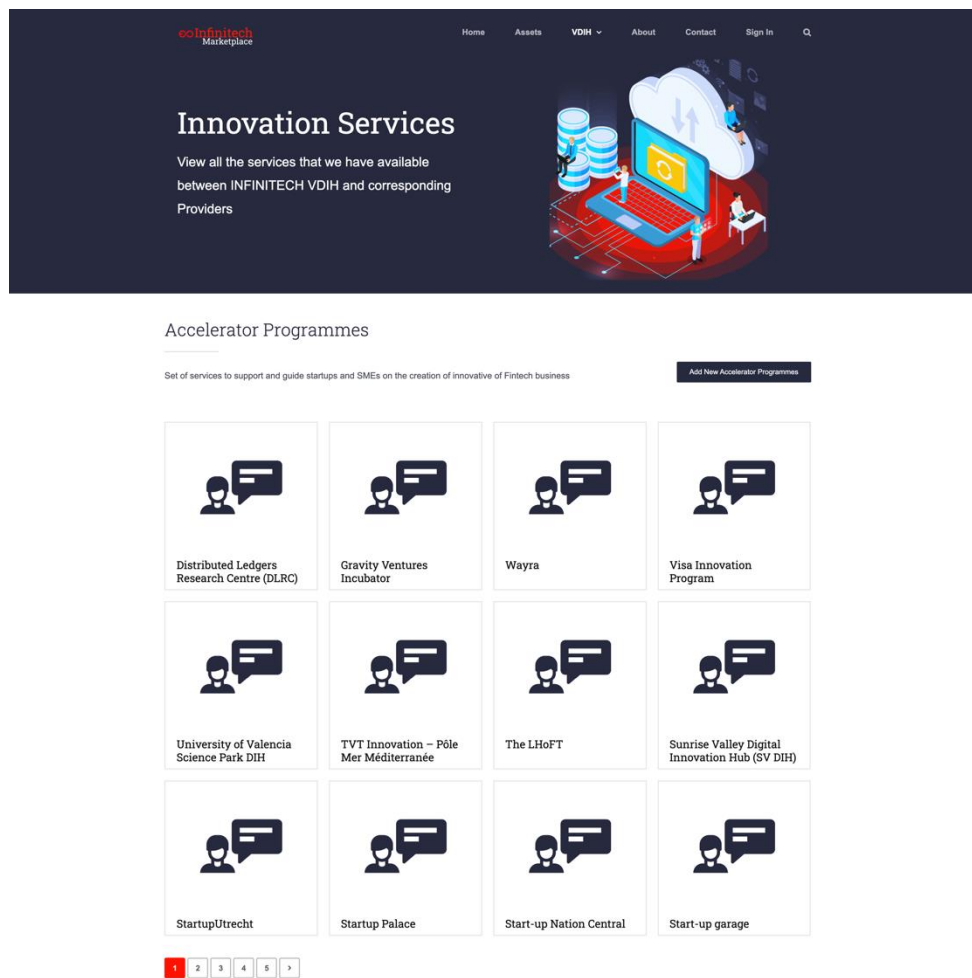


Figure 14: Accelerator Programmes Page

Appendix B - Marketplace Forms

The section contains all the forms available on the INFINITECH Marketplace:

- Assets
- Courses
- Workshops
- Webinars
- Accelerator Programmes

Assets Form

The screenshot shows the 'Add New Asset' form in the Infnitech Marketplace. The form is divided into several sections:

- Your Information:** Includes fields for First Name, Last Name, Email, and Company.
- Asset Information:** Includes a dropdown for 'What type of Asset is? .', a text field for 'Asset Name .', and three columns of fields: Owner, Estimated Release Date, Asset Composition, Link, Category, and Type.
- Tutorial Information:** Includes a dropdown for 'How many tutorials you want to add? .'.
- Additional Information:** Includes a file upload area with a dashed border and a 'Submit' button.

Figure 15: Assets Form

Courses Form

coInfinitech Marketplace

Home Discover VDIH About Contact

Add New Course

Add new information in Infinitech Marketplace

Your Information

First Name

Last Name

Email

Company

Course Information

What type of Course is it :
Select a option

Details

Course: Name :

Course: Link :

Course: Description

Course: Tags

Created by Level Cost Platform

Starting Date Ending date

Figure 16: Course Form

Workshops Form

coInfinitech Marketplace Home Discover VDIH About Contact

Add New Workshop

Add new information in Infinitech Marketplace

Your Information

First Name

Last Name

Email

Company

Workshop Information

What type of Workshop is it ?
Select a option

Details

Workshop: Name

Date

Duration

Summary

Video Links

How many videos you want to add ?
-

Additional Information

Speakers

Description

Upload files
Click or drag a file to this area to upload.

Submit

Figure 17: Workshop Form

Webinars Form

The screenshot shows the 'Add New Webinar' form in the Infinitech Marketplace. The form is structured as follows:

- Your Information:** Fields for First Name, Last Name, Email, and Company.
- Webinar Information:** A dropdown menu for 'What type of Webinar is :', followed by a 'Details' section with fields for Webinar Name, Organizer, Date, Webinar Website, and Webinar Description.
- Video Links:** A dropdown menu for 'How many link you want to add :'. The form currently shows '0'.
- Additional Information:** An 'Upload files' section with a dashed border and a central upload icon and text: 'Click or drag a file to this area to upload.'
- Submit:** A dark blue button labeled 'Submit' at the bottom left.

Figure 18: Webinar Form

Accelerator Programmes Form

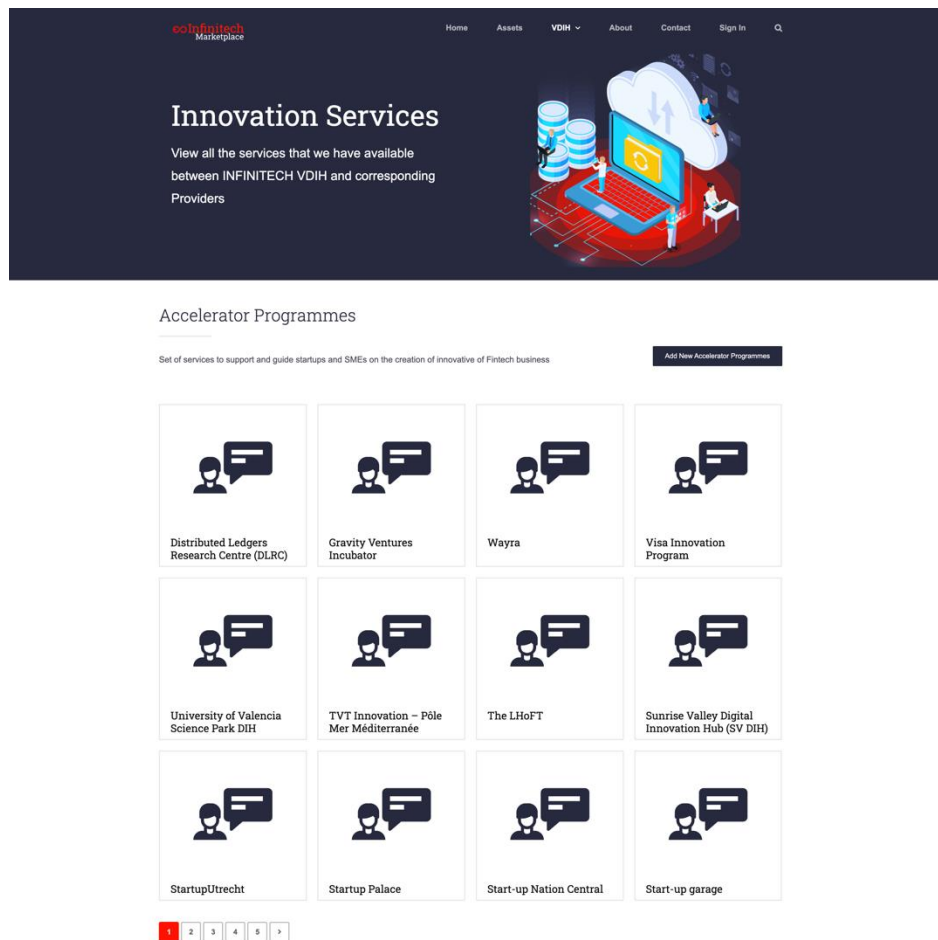


Figure 19: Accelerator Programmes Form