


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



## D8.11-Ecosystem Support Services and Third Party Solutions - I

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## Executive Summary

The goal of task T8.6 “Ecosystem Support Services and Third-Party Solutions Deployment” is to provide continuous technical support to users of the multi-sided market platform and of the Virtualized Digital Innovation Hub (VDIH). The support will concern the deployment/use of the project’s services, the use of the Open APIs and of the sandboxes and more. Furthermore, the task will ensure that third-parties receive support in their effort to integrate and offer their Big Data (BD)/Internet of Things (IoT) solutions or innovation services through the market platform or the VDIH respectively.

This is the first version of the deliverable of the two versions which will document the outcomes of task T8.6, intending to report the information regarding INFINITECH Ecosystem Support Services and Third-party Solutions establishment, under an Open Innovation Approach. It aims to provide the ground for a concrete process to provide specific services for integrating and linking Third party solutions to the INFINITECH Market Platform, deriving from the outcomes of the Hackathons, the outcomes of the seminars/webinars, as well as a focused desktop research on such solutions, for further education. This will leverage the deployment of INFINITECH multi-side market platform services -Open Application Programming Interface (APIs), sandboxes, VDIH services, b) support the third-parties for integrating their own solutions through the Platform or the VDIH respectively and c) exploit INFINITECH project’s results to a wider research and development community as well as the Finance and Insurance sectors.

In particular, the deliverable contains:

- The INFINITECH ECOSYSTEM strategy and open innovation approach based on the Design Thinking approach Principles.
- A mapping of INFINITECH Open Innovation Ecosystem’s four stage methodology for its development, including its values and capabilities, the respective stakeholders and tools for its establishment, as well as its sustainable process for the ecosystem enlargement.
- The INFINITECH ECOSYSTEM expected benefits and the challenges for the future
- Planned activities for organizing INFINITECH Hackathons and Webinars/Seminars
- Proposed suggestions and actions that could be followed within the next months from the internal stakeholders, for the INFINITECH ECOSYSTEM successful deployment to be fully reached out.

This key exploitation path of the INFINITECH multi-side market platform will drive the effective implementation of the INFINITECH ECOSYSTEM. The INFINITECH Ecosystem open innovative approach builds on a combined process. This includes inflows originated from consortium partners and outflows from third-party solution providers and innovators, such as solutions that will be implemented during the project’s hackathons or solutions that will be developed as part of the INFINITECH pilots or other available third-party solutions deriving from Fintech or InsuranceTech.

This approach provides added value to INFINITECH project results under a business-driven approach, considering the wider research and innovation community and driving its exploitation on a strategic level.

The work related to task T8.6 will continue until Month 39, where the last version that will be submitted as the final INFINITECH ECOSYSTEM will be upgraded dynamically in order to fulfil the INFINITECH project goals and sustainability.

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## Abbreviations

Abbreviation	Definition
AI	Artificial Intelligence
API	Application Programming Interface
BD	Big Data
DIH	Digital Innovation Hub
IMS	Innovation Management Services
DL	Deep Learning
EU	European Union
IoT	Internet of Things
OIS	Open Innovative Solutions
IMP	INFINITECH Market Platform
MLA	Machine Learning Algorithms
SES	Sandboxes Experimenting Services
SME	Small and Medium-Sized Enterprises
VDIH	Virtualized Digital Innovation Hub

# 1 Introduction

As technology is advancing, providers and users of business and financial services are adopting digital operating models in European Union (EU). Previous research indicates [1,2] that providing financial services, through innovative companies, increases users' and customers' attractiveness and acquisition, consequently driving the financial services providers to innovate. Despite the fact that financial services providers may potentially deploy innovative products, solutions, applications and systems on their own, internal innovation is usually hard to be achieved due to several barriers, and therefore third parties solutions are utilized to address the needs of various innovative applications' deployment in different domains [3]. In this respect, within the INFINITECH project a great number of various innovative open services has been developed, provided by the INFINITECH multi-side market platform.

The INFINITECH Market Platform (IMP) introduces the Asset concept, moving beyond the usual offer of algorithms within FinTech, by promoting additional open innovative solutions (OIS), functionalities and elements including technologies, models, components, services for Big Data (BD), AI and Internet of Things (IoT) solutions, such as algorithms' descriptions, validation datasets, open Application Programming Interface (APIs) and Sandboxes Experimenting Services (SES). Furthermore, the INFINITECH multi-side market platform hosts innovation management services (IMS), acting as a digital innovation hub (DIH), the Virtualized Digital Innovation Hub – (VDIH) services that can be exploited by FinTech and InsuranceTech practitioners.

Providing such a range of innovative solutions through the INFINITECH multi-side market platform, the opportunity for the INFINITECH project to play a significant role in the digital transformation of businesses and the financial industry is highlighted, acting as an important liaison of a broader business and finance services ecosystem.

Therefore, to meet this opportunity and to effectively exploit the project's results, the building and deployment of the INFINITECH ecosystem is immense. In this regard, the deliverable D8.11 provides information on how the respective ecosystem can be developed. Building on Design Thinking principles, it focuses on its Open Innovation approach, its clear methodology for its development and establishment, on the several actors and contributors engagement, its tools and its benefits, as well as on the required interactions among these several stakeholders that are needed, so as for them to be interrelated through the INFINITECH multi-side market platform by:

- a) receiving support in their effort to ingest and retrieve Platform assets and
- b) integrating and offering their Big Data / IoT solutions or innovation services through it.

This key exploitation path for the INFINITECH multi-side market platform will drive the INFINITECH ECOSYSTEM effective implementation, providing added value to INFINITECH project results under a business driven approach, considering the wider research and innovation community.

The major sources of insights for deliverable D8.11 and more specifically for Chapter 2 derives from a review on previous research that was performed, not highlighting its scale, thus focusing on open innovation Fintech Ecosystems for financial services, as well as from the Design Thinking Approach. What is more, INFINITECH multi-side market platform provided services -Open APIs, sandboxes, VDIH services, as they were fully presented

in WP8 Deliverables, namely D8.1 Market Platform and VDIH Specifications – I and D8.2 Market Platform and VDIH Specifications – II, which constituted a valuable insight for the performed review. The presented actions in section 2.5. already undertaken within the INFINITECH project, in order for the Ecosystem to be further developed, were mainly based on the contents from the deliverables of WP9, D9.3 Dissemination and Communication Activities - II and D9.9 Community Building Report – I. The results of those contributions are explained in the following sections.

In this respect, this deliverable includes the following information and contributions regarding the INFINITECH Open Innovation ECOSYSTEM Framework; a) the presenting the design approach and principles, b) a descriptive drawing of its development methodology, presenting the main four stages that should be followed in order to be achieved, which they are respectively analysed, c) the expected outcomes, as well as the challenges that arise from its design and implementation and d) the proposals that INFINITECH consortium members could follow, in order for the INFINITECH ECOSYSTEM successful deployment to be fully reached out.

### 1.1 Objective of the Deliverable

The main objective of this deliverable is to describe the relevant Framework for the INFINITECH Ecosystem and the Third party Solutions establishment, supporting the goals of Task 8.6. Therefore, it contains a report that represents the necessary procedures, under an Open Innovation Approach, for facilitating and further exploitation of the INFINITECH multi-side market platform services to the broader Finance, Insurance, academic and professional community and for supporting the third-parties solutions integration through the Platform or the VDIH respectively. In more detail, the deliverable contains the INFINITECH ECOSYSTEM Open Innovation co creation model approach, its methodology for its development and establishment, analyzing its specific components, such as strategy, actors and contributors' engagement, its tools and benefits, providing the respective challenges for future enlargement. Building on an open community approach, it specifies the respective procedures for its sustainability, so as to go beyond INFINITECH project's results. Finally, it includes proposed suggestions and actions that could be followed, for the ECOSYSTEM to reach its full potential.

### 1.2 Insights from other Tasks and Deliverables

The deliverable D8.11 is the first one that is released for task T8.6, so it provides the initial analysis for the development concept and pilot implementation of INFINITECH Ecosystem Support Services and Third Party Solutions of the INFINITECH Project. Based on this, additional deliverables of WP8 will be produced, providing valuable information for leveraging the strategies and processes for the Ecosystem enlargement. In more detail, Task T8.2 will provide the deliverables D8.3 Big Data and AI Solutions Marketplace – I, D8.4 Big Data and AI Solutions Marketplace – II, Task. T8.3 will provide D8.5 IoT and Blockchain Solutions Marketplace – I and D8.6 IoT and Blockchain Solutions Marketplace – II, Task. T.8.4. will provide deliverables D8.7 Virtualized Digital Innovation Hub – I and D8.8 Virtualized Digital Innovation Hub – II, in which all types of INFINITECH Market Platform are specified, enabling to develop an advanced strategy for the recruitment and engagement of the internal and external stakeholders. Towards this, Task T.9.1, providing deliverables D9.4 Dissemination and Communication Activities – III and D9.5 Dissemination and Communication Activities – IV, as well as Task 9.3,



providing deliverables D9.10 Community Building Report – II and D9.11 Community Building Report – III will be also helpful.

## 1.3 Structure of the Document

This deliverable is composed of four main sections. Chapter 1 is the introduction to the deliverable and includes the description of the objective, insights from other tasks and deliverables, as well as this deliverable's structure. Chapter 2 describes the INFINITECH Ecosystem Support Services and Third Party Solutions development analysis. Finally, Chapter 3 concludes the document, providing suggestions for the advance of the INFINITECH Ecosystem.

## 2 INFINITECH Ecosystem Support Services and Third Party Solutions: Framework and Development

### 2.1 INFINITECH Ecosystem Design Thinking Approach

Financial and insurance sectors face ultimate transformations due to the new technologies' employment in providing financial services, products and solutions to companies and to customers. This technology-driven innovation approach not only affects finance processes and provided services, but it also promotes broader transformation and opportunities leading to their structural shifts. Under the reciprocal relationship of finance and technology, where several interdependencies among respective stakeholders –providers, managers, governance, policy and regulatory makers and developments- are settled, customers' expectations for digital financial services raise more and more interest [4]. However, and despite the fact that the ongoing COVID 19 pandemic, the respective lockdowns and social distancing further emerge this need, the financial domain does not meet it adequately. Previous research [5] indicates that this need could be addressed if financial providers increase their digital presence and include additional digital services into the core ones offered, such as powerful branding, online regular touchpoints, security and compliance with regulations.

Towards this, the establishment of an innovative ECOSYSTEM is considered of great importance, in order to improve the financial services by using innovative technology and gaining more customers and loyalty [6]. Considering that an ecosystem is developed with the contribution of a wide range of actors — such as companies, Fintech providers, startups, government regulators, consumers- consequently it acts as a partnership among them, through open interactions and hyper-connectivity. Furthermore, it enables the creation of added value financial services and products [7], which no partner or potential stakeholder could achieve on his own.

Up to this, since the INFINITECH project is a joint effort of global leaders in ICT and finance towards leveraging technology driven innovation, boosting regulatory compliance and stimulating additional investments, the developing and functioning of the INFINITECH ECOSYSTEM is required, so as for the effective deployment of INFINITECH project goals to be achieved.

Building the INFINITECH ECOSYSTEM provides opportunities, based on the articulated cooperation among INFINITECH services and finance service providers, to adequately address customer needs and the growing demands on leveraged products and services, as previous literature suggested for such systems [8]. Thus, to address that, it is of great importance to focus and develop a straightforward methodology for its design and implementation.

In this respect, the INFINITECH Ecosystem Support Services and Third Party Solutions is being designed by following the Design Thinking Approach [9], a well-acknowledged methodology among organizations and companies worldwide. With reference to business, as an approach, strategy and methodology, it focuses on three key principles regarding the design of services, in order to meet complex business challenges. In particular, it focuses on: a) Human Centered Design, referring in stakeholders' real needs, b) Iterative Design, referring in all stakeholders' feedback, considering that innovation is an on-going process and stakeholders have

multidirectional roles and c) Systemic Design, focusing on maximizing impact, taking into account that in order for impactful innovation services to be offered, a multidisciplinary team is required.

Under these Design Thinking Approach principles, the following strategic parameters are considered to be examined for the effective design and development of the INFINITECH Ecosystem.



Figure 1 – Strategic parameters of the INFINITECH Ecosystem development

## 2.2 INFINITECH Ecosystem Strategy and Open Innovation Approach

Following the above mentioned parameters, at first it should be noted that previous literature has shown that Fintech ecosystems impact financial services in multiple essential different ways, in particular when they operate under market mechanisms [11]. In this regard, Market Platforms not only provide Innovation for the development of the services, products and solutions, but they also consist of a focal point for the establishment of a relevant ecosystem [12,13]. Towards this, the INFINITECH multi-side market platform consists of the INFINITECH project partners' strategic choice for the developing of its Innovation Ecosystem, aiming at providing a significant deliverable to the INFINITECH stakeholders and in the finance sector in general.

In recent years, more and more attention has been paid in research and market regarding the Open innovation Ecosystems within finance services, as a functional framework for their growth and development [14,15]. These ecosystems refer to interdependent stakeholders, e.g. businesses, clients, communities, universities, governments and regulators across public and private sector, interrelated through digital platforms, so as to be enabled to collaborate and share ideas, knowledge, capabilities, products and solutions, aiming at co-innovating

[15,16] and providing valuable services. These services are promoted within these symbiotic actors, leveraging their performance.

Under this light, the INFINITECH multi-side market platform concerns the development of an integrated open innovation environment, enabling the utilization of big data and AI techniques, including machine and deep learning (DL) algorithms developed by the INFINITECH consortium experts. Furthermore, it supplies additional elements, such as full algorithms' descriptions, validation datasets, and training and evaluation outcomes for these algorithms, in order for the finance and insurance stakeholders to have the opportunity to utilize them. It also acts as a digital innovation hub, providing innovation management services, called Virtualized Digital Innovation Hub (VDIH services), which can be exploited by FinTech, Finance and InsuranceTech practitioners.

Thus, the INFINITECH multi-side market platform, going beyond the ingestion and retrieving of these services from stakeholders, it aims at developing further interactions with interested third parties under a modern open innovative approach, supporting them to provide their own Big Data/IoT solutions or innovation services through the market platform or the VDIH respectively. This modern approach is focused on the wide distribution of innovative knowledge sources within the finance domain and on the growth of pioneering solutions grounded on cooperation among several parties [17]. As Henry Chesbrough emphatically supports "Open Innovation is a paradigm more distributed, more participatory, more decentralized to innovation, based on the observed fact that useful knowledge today is widely distributed, and no company, no matter how capable or how big, could innovate effectively on its own". In this regard, not only the release of INFINITECH multi-side market platform services to the wider research and innovation community is of great importance, but also the aggregation of resources from FinTech accelerators/clusters, incubators of the incumbent financial and insurance organizations, FinTech developers, R&D organizations and other stakeholders of the consortium.

The diversity of technologies and services of the INFINITECH multi-side market platform, described in detail in Deliverable D.8.2., including a) different types of assets, such as ML algorithms, Docker containers, Notebooks and b) VDIH services, such as Training Catalogue and Accelerator Catalogue are fully presented in INFINITECH Market platform website: <https://marketplace.infinittech-h2020.eu/>.

Taking advantage of the growing INFINITECH services available on the multi-side market platform, they can contribute to financial institutions to deliver new competencies promptly. In particular, market platforms have been already suggested by previous research as a well-established practice to promote open innovation within different sectors, considering the combination of the external inputs from the early stages of the ideation and research until to the implementation and finally distribution of the provided solutions [4, 5].

Towards this end, the INFINITECH Ecosystem open innovative approach builds on a combined process. This includes inflows that originate from consortium partners and outflows from third-party solution providers and innovators, such as solutions that will be implemented during the project's hackathons or solutions that will be developed as part of the INFINITECH pilots or other available third-party solutions deriving from Fintech or InsuranceTech. This approach provides additional value to the INFINITECH project results, driving its exploitation on a strategic level. The following Fig. 2 represents the INFINITECH ECOSYSTEM open innovation approach.

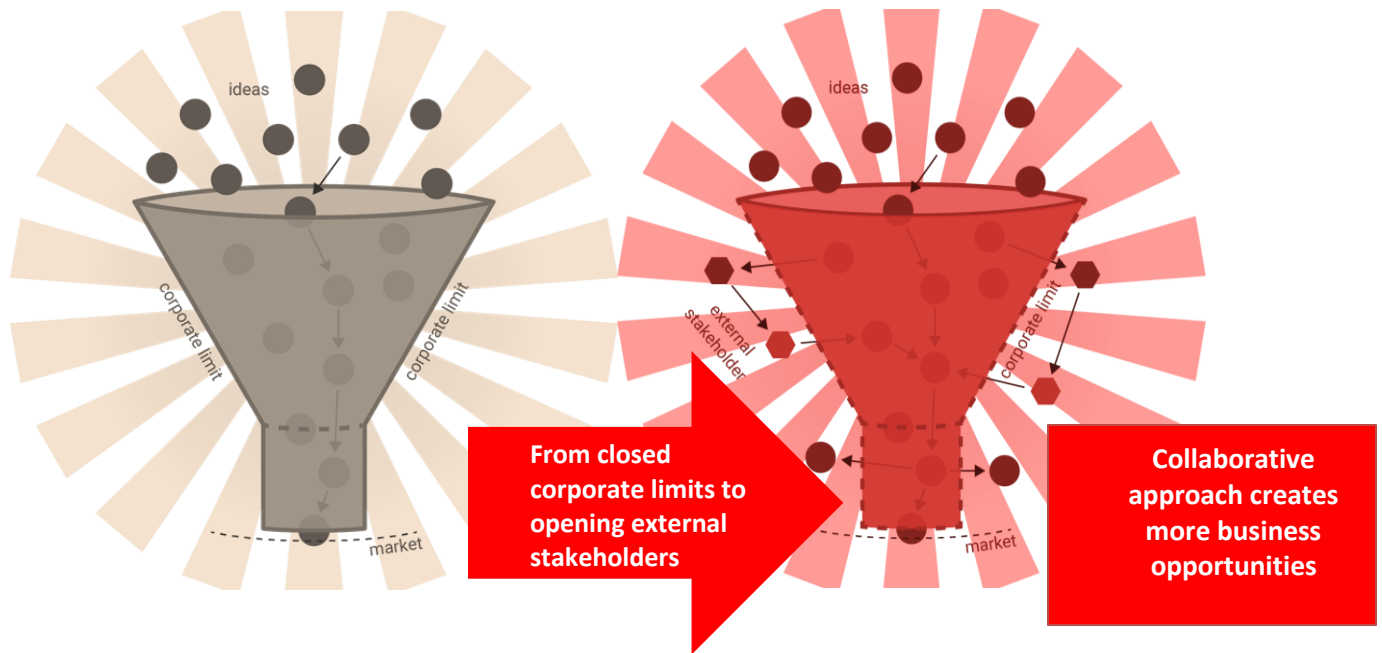


Figure 2 – INFINITECH ECOSYSTEM Open Innovation Approach: From the old innovation process paradigm to a new model of innovation

Such an Open Innovation Approach for the INFINITECH Ecosystem combines the advantages of Fintech and Financial Sector, facilitating a clear focus on the future, in order to provide solutions, which can meet the evolved demands of customers.

## 2.3 INFINITECH Ecosystem Methodology

In order for this approach to be leveraged and the INFINITECH Open Innovation Ecosystem to be functional, a clear methodology for its development is being followed. This methodology is setting the ground for deploying a concrete process to provide specific services, such as the organizing of hackathons and seminars/webinars, in order to include third-party solutions to the INFINITECH Market platform. This is represented in the following figure, concerning four distinct steps, which are further analyzed as well.

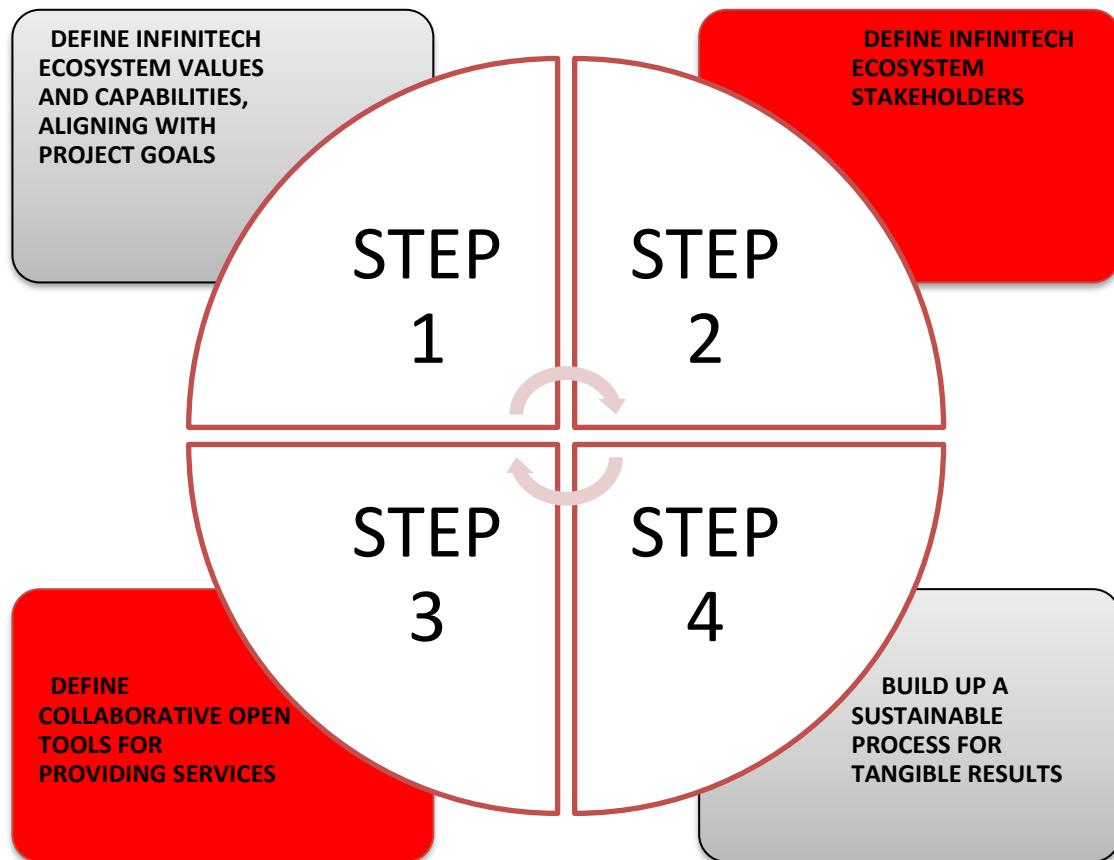


Figure 3 – INFINITECH Open Innovation Ecosystem methodology

### 2.3.1 INFINITECH Ecosystem methodology-Step 1

Step 1 “Define INFINITECH ECOSYSTEM VALUES AND CAPABILITIES” is referring to the determination of the INFINITECH Ecosystem supported values and capabilities, in order to meet the project’s goals and to be adequately deployed.

INFINITECH project aims at leveraging the benefits of IoT, Big Data and AI and at realizing the full potential of these technologies in the financial and insurance sectors; considering a set of challenges, such as regulatory barriers, the lack of datasets, testbeds and validated business models, that still must be overcome to improve the overall efficiency of business processes and optimize the decision making. In this regard, the key values of the INFINITECH Ecosystem focus on Customer centricity, Business Agility, Adaptivity and Innovation, as the key differentiators required by an ecosystem to be well-established, as reflected in Fig.4.

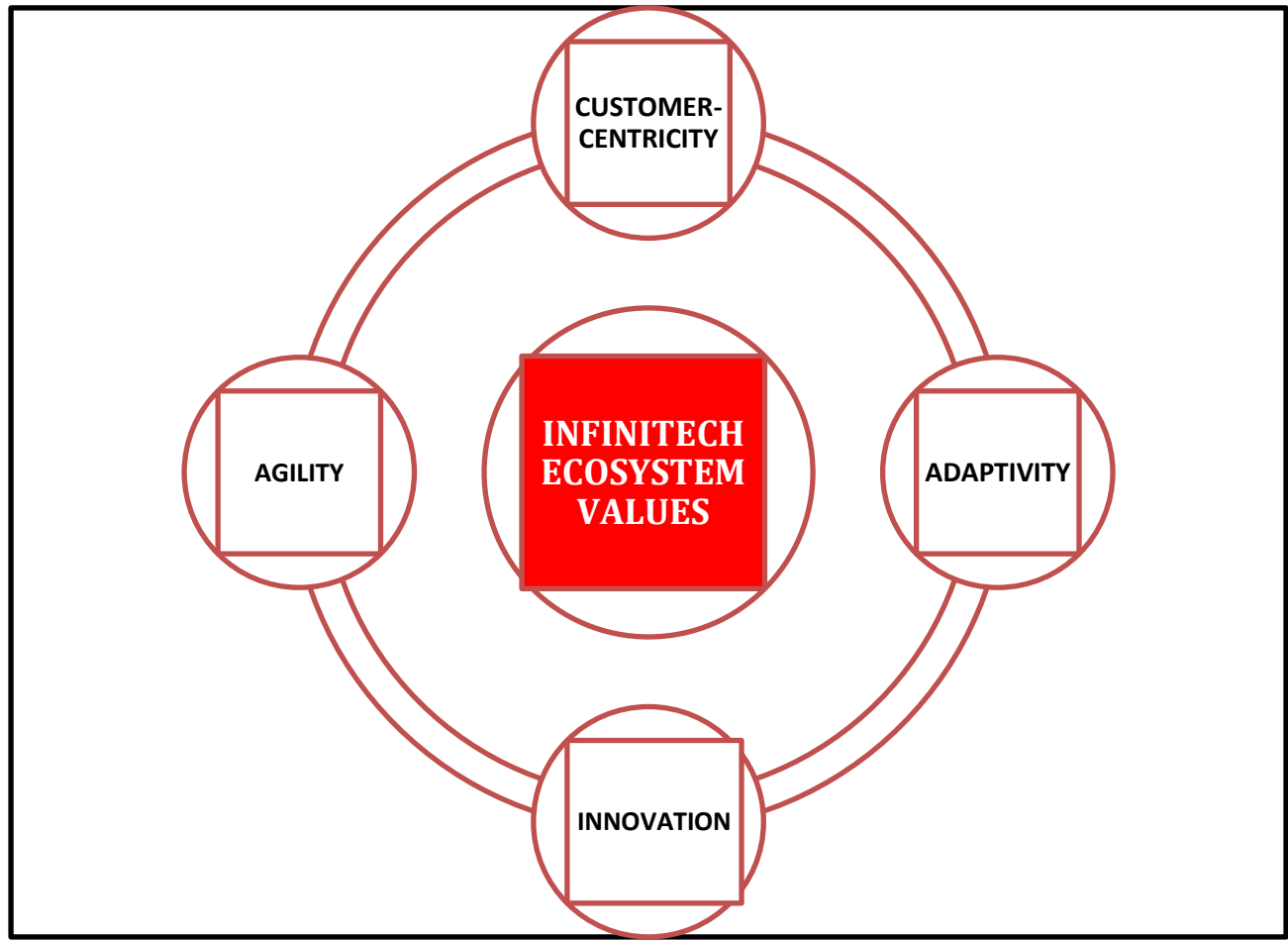


Figure 4 – INFINITECH Open Innovation Ecosystem values

- **Customer centricity:** This value, acknowledging that customers are the vital beneficiaries of the value of the created INFINITECH solutions, consists of a mindset for the Ecosystem establishment, which emphasizes on creating positive experiences for the end-users through the full set of products and services provided by the Market Platform.
- **Agility:** This value is adopted, since it supports that each stakeholder who is involved in delivering solutions, business, technology, operations, marketing, legal, finance, compliance, security within INFINITECH Market Platform should be in alignment with each other, focusing on the end-users' demands.
- **Adaptivity:** This value concerns the INFINITECH Ecosystem capability to adopt new ways of productivity and interaction, in order to achieve several benefits, such as speed in execution, end-user satisfaction and bottom-line results.
- **Innovation:** This value, considering that INFINITECH project promotes novel Big Data/IoT technologies for seamless management and querying of all types of data, refers to the Ecosystem

capability to deliver innovative, high quality products and services in a faster way while remaining sustainable.

Another essential parameter for the INFINITECH Ecosystem to be well-established, is the determination of its vital capabilities, concerning different domains within Fintech and financial services, such as regulations, innovative technologies, risk management. Their determination and categorization derives from INFINITECH project expected results, namely: a) the Reference Architecture & Blueprints for BigData, IoT and AI applications, b) Interoperability & Data Exchange solution, c) Seamless Data Management & Real- time Analytics – OpenAPIs, d) experimentation facilities (testbeds & sandboxes), e) Advanced business models, f) Smart, Holistic, Autonomy, Personalized and Regulatory Compliance applications, g) catalyst for increased investments in BigData & IoT Digital Finance Applications, h) Flexible and cost-effective regulatory compliance.

These interdependent capabilities, presented in Figure 5, are further explained as following.

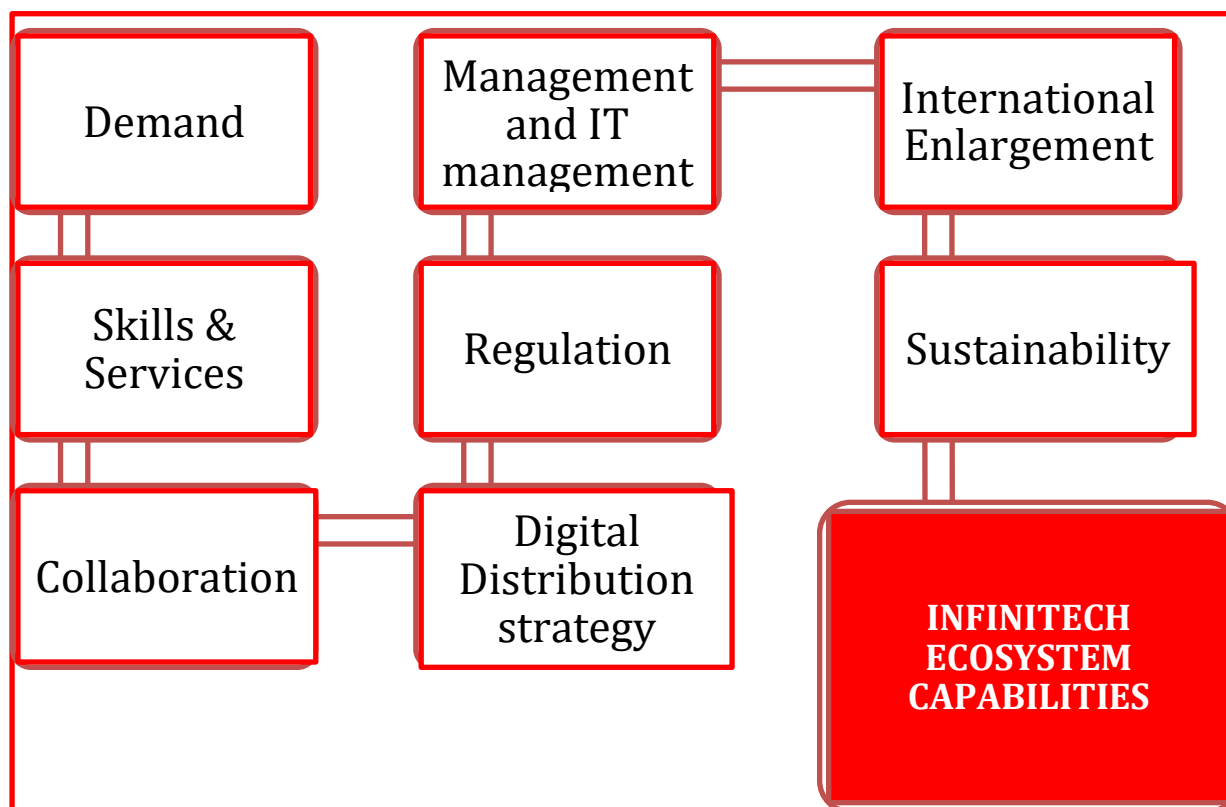


Figure 5 – INFINITECH Open Innovation Ecosystem Capabilities



- **Demand:** It refers to the INFINITECH ecosystem ability to focus on the end-users needs and demands within financial providers, customers and government.
- **Skills:** It refers to the INFINITECH ecosystem availability to provide technical and financial services, based thus on partners' talent, in order to leverage its outputs.
- **Collaboration:** It refers to the INFINITECH ecosystem availability to provide process support in order for third parties to be engaged within it and provide their own solutions as well.
- **Digital distribution strategy:** It refers to the INFINITECH ecosystem availability to provide services effectively via digital channels, leveraging its function.
- **Regulation:** It refers to the INFINITECH ecosystem ability to focus on government policies across financial and insurance sector growth, as well as its availability to be regulatory and audit compliant.
- **Management & IT management:** It refers to the INFINITECH ecosystem ability to improve process management and functions, as well as to assess and manage IT related risks.
- **International enlargement:** It refers to the INFINITECH ecosystem ability to exploit global opportunities, such as new market strategies.
- **Sustainability:** It refers to the INFINITECH ecosystem ability to improve and preserve its resources and stakeholders.

### 2.3.2 INFINITECH Ecosystem methodology-Step 2

Step 2 “Define INFINITECH ECOSYSTEM STAKEHOLDERS” is referring to the determining of the INFINITECH Ecosystem stakeholders, in order for the project results to be shared, as well as for the integration of third parties solutions within it.

Since the development of a well-functioning ecosystem depends on adoption by all stakeholders [18], their identification is crucial. Their determination is based on INFINITECH services and products as well. The whole Open Innovation Ecosystem Approach for promoting INFINITECH multi-side market platform services, from the early stages of the ideation until the distribution, includes not only INFINITECH partners, but also third party providers and the end users of finance and insurance services. Furthermore, it takes into account that collaborative innovation procedures concern researchers, developers, service providers, clients, competitors, communities, or even the support of hackathons, as Fasnacht [6] argues. They can share information, knowledge and the cognitive technologies and solutions, provided by the INFINITECH multi-side market platform, since knowledge sharing is the key in modern economy.

For instance, financial institutions (e.g. banks, insurance and reinsurance companies, brokers, payment providers, asset managers, private equity) and Big Data/IoT solutions integrators will be interested to participate in the INFINITECH ecosystem in order to integrate INFINITECH's solutions to their products or services. AI/ML

Startups & Small and Medium-Sized Enterprises (SMEs) will be interested to participate in the INFINITECH ecosystem in order to leverage their knowledge, participating in the provided courses through VDHI. Fintech and Insurance Tech firms, engaged in the Ecosystem, will have the opportunity to test in real environments their latest innovations, in order to commercialize them. Academics and researchers will be interested to be a part of the Ecosystem, in order to monitor the state-of-the-art in the field of digital finance. Regulatory and policy makers will be interested to be involved, in order to be informed for the latest innovations, deriving feedback for the relevant regulations design. What is more, consultants will be interested to participate in monitoring innovation for their customers and to distribute this innovation among their customers.

The INFINITECH ECOSYSTEM stakeholders are indicatively reflected in the following Figure 6:

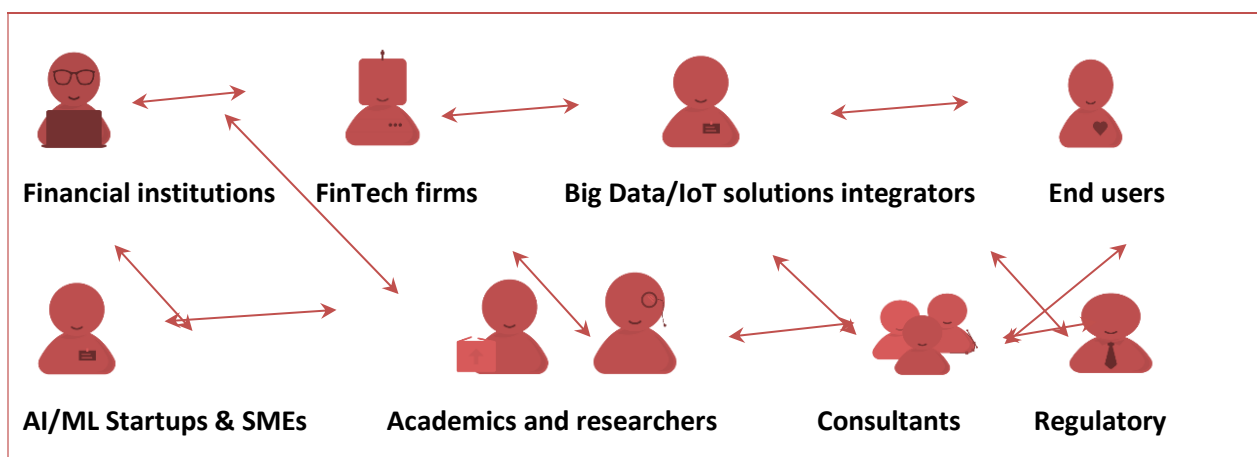


Figure 6 – INFINITECH Open Innovation Ecosystem Stakeholders

### 2.3.3 INFINITECH Ecosystem methodology-Step 3

**Step 3 “Define INFINITECH ECOSYSTEM TOOLS”** is referring to the INFINITECH Ecosystem tools determination, in order for the project’s results to be further exploited and distributed and the subsequent Ecosystem enlargement.

These tools are described as follows:

- **INFINITECH internal meetings:** These include all INFINITECH consortium member meetings, in order for all the partners to be updated regarding the projects’ results. The meetings leverage collaboration among them and promote the focused organization of specific events, such as Hackathons and webinars.
- **INFINITECH Hackathons:** These promote interactions with stakeholders outside the consortium members, in order to develop new ideas and solutions regarding INFINITECH Ecosystem assets and services, while leveraging skills.

- **INFINITECH Open Innovation Webinars/Seminars/Workshops:** These concern a wide range of INFINITECH series of seminars/webinars regarding the Market Platform services, in which consortium members, as well as external partners from their networks, contribute with educational and technical content to the relevant subject that is presented, leveraging knowledge sharing.
- **INFINITECH Stakeholders Alliance (ISA):** This tool aims to facilitate third-party stakeholders, beyond the INFINITECH consortium, to be involved in the INFINITECH Ecosystem, by providing within the Market Platform their own solutions or by commercializing the project's results as users, integrators or resellers, under a signed MoU (Memorandum of Understanding) among the INFINITECH consortium and the relevant ISA stakeholder. This tool can be realized, after the integrated outcomes of the organized INFINITECH hackathons to the Market Platform.

### 2.3.4 INFINITECH Ecosystem methodology - Step 4

**Step 4 “Define INFINITECH ECOSYSTEM SUSTAINABLE PROCESS”** is referring to the determination of the INFINITECH Ecosystem process that will reassure that the project results will be widely distributed, while the Ecosystem will be sustainable under a business-driven view, leveraging collaborations among all interested stakeholders.

This process, considering INFINITECH Ecosystem Open Innovation Approach, Values and Capabilities, Stakeholders and tools, is indicated by three stages, namely:

- **Engagement and Crowdsourcing**, aiming to offer the opportunity to all stakeholders to be further engaged within the INFINITECH Ecosystem, building an INFINITECH culture.
- **Acceleration and Incubation**, aiming at leveraging Ecosystem's services, gathering feedback, extending partnerships and enabling knowledge development and sharing among all stakeholders.
- **Ecosystem Implementation**, aiming to achieve a sustainable market oriented operation, providing the necessary toolkits and branding for engaging not only stakeholders themselves, but also their networks, generating INFINITECH reputation among Finance, Insurance and Fintech domains.

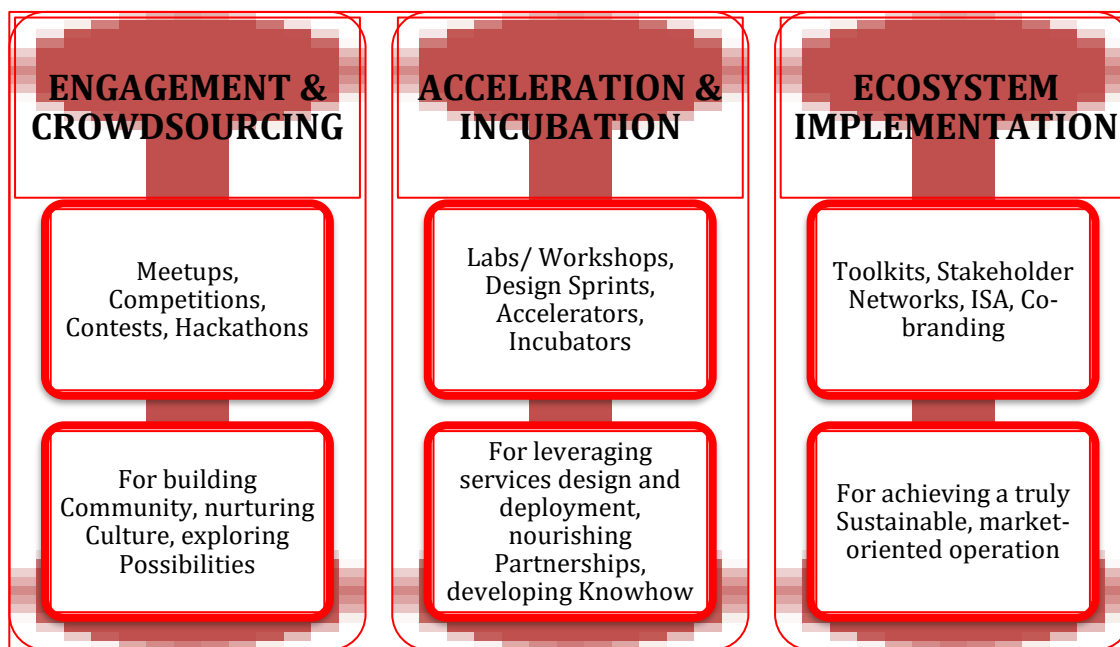


Figure 7 – INFINITECH Ecosystem Sustainable Process

### 2.3.5 INFINITECH Ecosystem Third party Solutions integration Services

In this regard, Third Party Solutions integration to the INFINITECH Market Platform will be deployed, based on solutions that will derive from INFINITECH developments and integrated third party solutions to the Market Platform as Hackathons results, as well as through linked third-party solutions for education and training, presented as follows:

#### a) The outcomes of INFINITECH ECOSYSTEM Hackathons

The INFINITECH project has already planned and will organize a series of hackathons aiming at:

- i) Attracting digital finance stakeholders (i.e. third-parties) in the INFINITECH Market Platform and boosting their engagement with INFINITECH solutions. Specifically, hackathon participants will be offered with the opportunity for using INFINITECH assets/solutions in developing their own applications. A variety of hackathons will be organized for different audiences, including both academic (e.g., students, researchers) and industrial (e.g., FinTechs, banks, digital finance experts) audiences.
- ii) Producing and on-boarding new solutions in the INFINITECH Market Platform. Hackathons participants will be producing a pool of INFINITECH related solutions, including solutions that will leverage the project's results. These solutions will be integrated in the INFINITECH marketplace in order to broaden the number and type of available assets of it. The on-boarding of a public version of the produced solutions in the marketplace will be a prerequisite for participating to the hackathons. Relevant information will be communicated to the participants upon their registration to the hackathon. **An initial list of planned hackathons is provided in paragraph 2.4.2. Planned Activities of this deliverable.**

## b) INFINITECH Ecosystem Webinars/Seminars

To animate the INFINITECH communities, notably third-party members, and to provide value to the registered participants of the INFINITECH Marketplace, the project will regularly organize thematic webinars. The latter will be addressed to the members of the INFINITECH community and will be aimed at raising awareness about the contents and solutions of the marketplace, while at the same time providing information and training on how to take advantage of the INFINITECH assets. The Webinars will primarily targeted registered members to the INFINITECH marketplace, yet they may be also opened to the public to increase participation and engagement. They will provide a channel for regular interaction / communication among the members of the ecosystem. Webinars will be organized every three months after M27. Moreover, they will be thematic i.e. dealing with a specific INFINITECH topic at a time. **An initial list of planned Webinars is provided in a later paragraph 2.4.2. Planned Activities of this deliverable.**

Furthermore, for enhancing education and training activities, the project targets on linking a catalogue of well-established third parties solutions. This catalogue is provided in detail in Deliverable D8.9 Third-Party FinTech and InsuranceTech Solutions – I.

## c) Collection and Curation of Big Data and AI-based Digital Finance Solutions

INFINITECH will enrich the contents of its marketplace with a catalogue of available third-party digital finance solutions with relevance to the INFINITECH scientific and technological development areas. In this direction, the project will conduct desk research on available and related open source, publicly available solutions, while linking them to the marketplace. The objective will be to ease the discovery of open and publicly available solutions including solutions in the form of open source code, ML and data science notebooks, solutions documentations and descriptions (e.g., articles/blogs) and more. **The project targets the on boarding or linking of a minimum of 40 well-documented solutions.** Leveraging on a catalogue of such "linked" third party solutions, ecosystem participants will be able to search for digital finance solutions through a single entry point i.e. the service will reduce information fragmentation.

Indicatively, this catalogue will include solutions, such as a) the Trading and stocks prediction notebook (presented in <https://github.com/jer805/stock-prediction>), b) The KYC solution on github (presented in <https://github.com/accubits/smart-kyc>), c) the Financial Instruments and Pricing and Portfolio Optimization resources on GitHub (<https://github.com/wilsonfreitas/awesome-quant>). The finalized catalogue will be presented in the 2<sup>nd</sup> version of this deliverable D8.12 in M42.

## 2.4 INFINITECH Ecosystem Building Activities

### 2.4.1 Conducted Activities

The initial results of this sustainable process concern conducted activities, briefly summarized as follows, which are **described in detail in Deliverable D9.9 Community Building Report - I and in Deliverable D9.3 - Dissemination and Communication Activities – II.**

- Three INFINITECH General Assembly workshops that have been organized, in which more than seventy (70) members of the Project's consortium participated, setting the ground for planning the respective ecosystem activities.
- The organized Copenhagen Fintech Hackathon on September 23rd 2021 in Copenhagen Business School, focusing on solving global natural resources crimes. Besides INFINITECH's partners, global banks, tech companies and law firms were engaged to co-create solutions to combat illegal natural resource exploitation.
- Five (5) workshops and five (5) webinars regarding INFINITECH services.
- A Training on CyberRisk and Security-by design.
- INFINITECH consortium members participated in two international conferences
- Six (6) Publications have been published in different specialized magazines

In this respect, the Open Innovation INFINITECH Ecosystem is building on the energy dynamics of the complex context and relationships among the multiple stakeholders in and outside the project, focusing on partnerships and alignments, both downstream and upstream, that are of great significance for enabling technology development and innovation. The vision of INFINITECH project towards this is to specialize in a services net provided by the INFINITECH multi-side market platform, that will benefit all stakeholders from the outcomes of the INFINITECH Big Data, IoT and AI technologies, offering as well alternative solutions related to the Financial or Insurance Industry. Through this collaborative Ecosystem approach, knowledge will be easily consolidated and disseminated, promoting flexibility and agility, clearly leveraging co-innovation and high-value opportunities among INFINITECH project and the finance and insurance sector. The expected benefits of the fully implemented INFINITECH Open Innovation Ecosystem, that will be included in the 2<sup>nd</sup> version of this deliverable (M42) are summarized and presented in the following Fig.8.

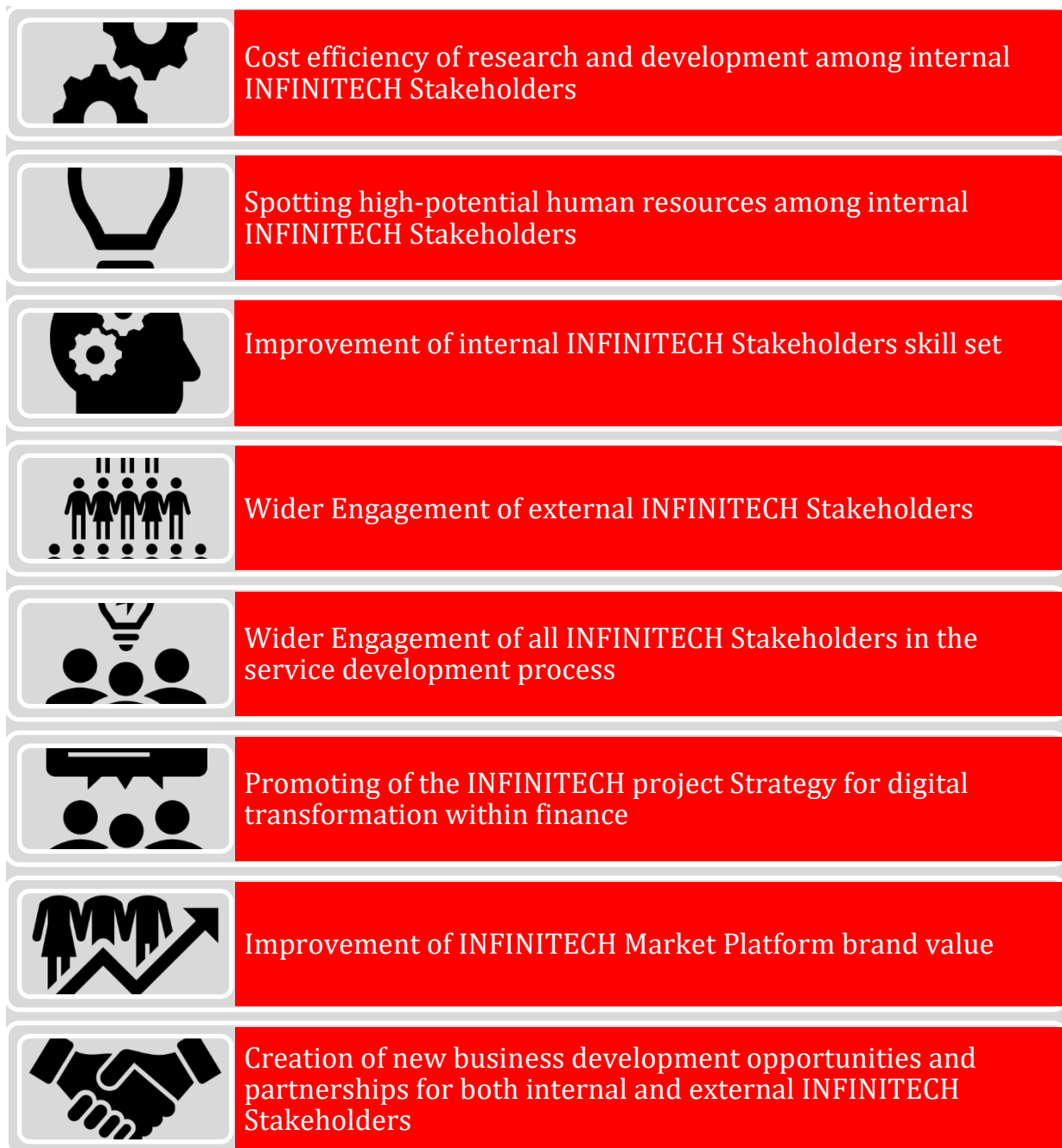


Figure 8 – INFINITECH Open Innovation Ecosystem Benefits

## 2.4.2 Planned Activities

The following activities have been planned in order to establish INFINITECH ecosystem activities:

### a) INFINITECH ECOSYSTEM Hackathons

Month	Topic	Link	Driving Partner
<b>M26</b> 24 November 2021	Finance Training / Recommendation Systems	<a href="https://crowdhackathon.com/infinitech/">https://crowdhackathon.com/infinitech/</a>	CP
<b>M33</b> June 2022	Personalized Retail / Investment Banking Services	Link to be provided	CP
<b>M42</b> March 2023	Insurance Services	Link to be provided	CP

Table 1 - INFINITECH Planned Hackathons

### b) INFINITECH Ecosystem Webinars/Seminars

Topic	Month	Driving Partner
<b>Personalized Closed-Loop Investment Portfolio Management for Retail Customers</b>	<b>M29</b>	CP
<b>Big Data Analytics for Usage Based Insurance Applications</b>	<b>M31</b>	INNOV
<b>Business Financial Management (BFM) tools delivering a Smart Business Advise</b>	<b>M32</b>	CP
<b>Real-Time and Personalized Risk Assessment for Effective Wealth Management</b>	<b>M35</b>	INNOV
<b>Personalized Portfolio Management</b>	<b>M38</b>	CP
<b>ML/AI Techniques for Digital Finance Use Cases</b>	<b>M39</b>	UPRC
<b>Blockchain Solutions for Digital Finance</b>	<b>M40</b>	CP

Table 2 - INFINITECH Planned Webinars/Seminars



## 3 Conclusions

The current version of the deliverable concerns the presentation of an integrated Framework regarding the development of the INFINITECH Open Innovation Ecosystem, including its strategy, approach and methodology, in order to be effectively implemented within the INFINITECH project.

Considering that the imperative for finance and Fintech sector to share knowledge under an open innovation co-creative environment has never been greater [5], INFINITECH Ecosystem Framework development provides a change in mentality about building a community around the INFINITECH projects' results and in particular around INFINITECH multi-side Market Platform, especially focusing on a sustainable and market operated process.

This approach is based on:

- a) the strong and talented consortium members, which are international leaders in ICT – e.g. computer programmers, data scientists- and in finance –e.g. financial engineers and financial service marketers,
- b) the different forms of resources deriving from the consortium members, crucial for INFINITECH Ecosystem and
- c) the growing demand for new financial services locally and internationally. In this regard, INFINITECH Ecosystem Framework provides the necessary procedures for building a complex network of interacting FinTech firms, financial institutions, academic and researchers, regulators and policy makers, aiming at advancing the financial services industry through technological innovation.

However, as far as INFINITECH Ecosystem's expected benefits are concerned, it should be noted that the Ecosystem implementation would reach its true potential, when its strategy and methodology will be fully adopted by the INFINITECH project, considering not only the availability of consortium members' talent and resources, but also the advantages deriving from incumbent external stakeholders.

Further challenges that the INFINITECH Ecosystem faces concern, as already indicated in previous research [19,20], the following: a) how incumbent financial institutions address technology innovation and provide access to critical resources, b) the difficulties among incumbents and start-ups collaboration establishment, c) the fact that finance sector is subject to considerable regulations, while governments are both promoters and Fintech innovations regulators, requiring a well-established cooperation among policymakers and private market actors and d) the fact that financial services tend to be geographically clustered.

Therefore, for the INFINITECH Ecosystem's adequately implementation and fully adoption within and beyond the project, a list of actions is required to be followed by all consortium members:

- Provision of all developed technologies, products and services in the INFINITECH multi-side Market Platform by all partners. As we have identified some of them, they may not have yet followed the good practice to promote their results within the Platform, following the respective guidelines. Thus, this is of great importance, so as for the development of the Ecosystem.
- Provision of descriptions and additional information for all provided solutions. While a number of solutions have been promoted through Market Platform, additional descriptions and information for each one- specific should be included, as well as the relative Open API input / output information descriptors and relative sandboxes and datasets that may be available. This will help stakeholders,

such as incumbent financial institutions to be better prepared to address the technology driven challenges or stakeholders such as policy makers to better monitor technology innovation.

- Based on the maturity of development of all Pilots (see WP7 deliverables in detail) and the adoption of INFINITECH Reference (Blueprint) Testbed Guidelines, all Pilots need to organize their respective workshops, leveraging projects' results to all stakeholders.
- Considering that the regulatory environment, laws and policies as well as access to regulators, considerably affect the success of the INFINITECH ecosystem, several third-party solutions in the areas of regulatory compliance, such as Anonymization, Natural Language Processing, Sentiment Analysis, Insurance or Investment Products, Recommendation Engines should be available through the Market Platform.
- The effective implementation of WP9 dissemination strategy, in order for the INFINITECH ECOSYSTEM to maintain strong international linkages.

In this respect, we expect, as the planned actions or modifications that will be performed within the next months by each partner, that the updated information about the progress of the INFINITECH ECOSYSTEM successful deployment, will be included in the final version of this deliverable, which be issued in M42 of the INFINITECH Project.

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