



Deliverable 4.7

Report on Strategic Research Partnerships

Document details:

Editor:	CUT
Contributors:	CUT, UNIROMA, JADS
Date:	11/01/2023
Version:	V7.0

Document history:

Version	Date	Contributor	Comments
1.0	10/06/2022	A.S. Andreou S. Mappouras A. Christoforou P. Christodoulou M. Pingos	Initial document, structure and content
2.0	30/06/2022	A.S. Andreou S. Mappouras	Additions & Corrections
3.0	28/07/2022	A.S. Andreou Partners	First review
4.0	29/08/2022	S. Mappouras	Additions & Corrections
5.0	19/09/2022	A.S. Andreou	Final review
6.0	29/09/2022	Partners	Final review & approval
7.0	11/01/2023	A.S. Andreou	Document Revision

Contents

1. Introduction	4
1.1 Purpose	4
1.2 Definitions, Acronyms, and Abbreviations	4
1.3 Overview	4
2. List of Strategic partners and stakeholders	6
2.1 PARADISIOTIS GROUP	6
2.2 SEWERAGE BOARD OF LIMASSOL	9
2.3 Water Development Department of Limassol	10
2.4 LIMASSOL MUNICIPALITY	11
2.5 OKYPY - State Health Services Organization of Cyprus	12
2.6 SOFTONE	14
2.7 CYENS – CENTER OF EXCELLENCE	15
2.8 ERATOSTHENES CENTER OF EXCELLENCE (CoE)	17
2.9 Aratos Group	19
2.10 Deputy Ministry of Shipping Cyprus	20
3. Conclusions	22

1. Introduction

1.1 Purpose

This deliverable is part of Work Package 4 (WP4) that describes the actions needed to be taken from the consortium to engage industrial and business stakeholders and establish direct communication channels for feedback and collection of real-world data that will facilitate experimentation and validation, and prepare the road for future piloting. Furthermore, WP4 suggests methods and actions followed by the consortium to extend the community and networks of strategic research collaborators, and support sustainability by attracting EU and national funding in the future.

1.2 Definitions, Acronyms, and Abbreviations

CUT: Cyprus University of Technology

CING: Cyprus Institute of Neurology and Genetics

CoE: Centre of Excellence

CYENS: Centre of Excellence (formerly known as RISE)

SBLA: Sewerage Board of Limassol

WBL: Waterboard of Limassol

WDD: Water Development Department

DCH: Digital Cultural Heritage

BPM: Business Process Mining

1.3 Overview

The rest of the document is structured as follows: Sections 2 to 13 describe the major findings from the meetings held, mostly online but also some with physical presence, in the form of

minutes and notes, structured around the different organizations-stakeholders. It should be noted that in some cases more than one meeting was performed as a follow up or continuation of the discussions. This deliverable summarizes for each stakeholder the most important findings from all meetings. Finally, Section 14 concludes this deliverable.

2. List of Strategic partners and stakeholders

2.1 PARADISIOTIS GROUP

1. Profile

Paradisiotis is one of the most technologically advanced food production companies in Cyprus. It started in 1975 with one small center, and now it has 4 centers using the latest technology, to ensure the best service for the whole country. Paradisiotis Ltd is not only one of the largest and most accomplished companies in the field of chicken farming in Cyprus but ever since the company's inception in 1975, it has always looked to producing the best products for the Cypriot consumer. The company's mission has, and will always continue to be, to produce tasty, easy to prepare quality products to satisfy the pocket and the needs of every individual person in Cyprus. Paradisiotis Ltd holds approximately 25% of the food product market and thus is due to the fact that the company and its employees adhere values. This value includes teamwork, innovation, quality products, good service and the respect for the needs of the Cypriot consumer, always trying to improve the range of products and services to suits their needs.

2. Potential fields of collaboration

Paradisiotis as a technologically advanced company who continuously seeks for technological improvements, at the beginning of the project was a stakeholder of DESTINI expecting to apply the research outcomes of the project. It is worth mentioning that CUT and Paradisiotis have signed a memorandum of understanding in 2018 in the context of an EU-funded project "DOSSIER-CLOUD". This partnership was re-confirmed during DESTINI.

Process mining: Extensive discussion about utilizing Paradisiotis' log files to perform process analysis and/or improvement. Logs are stored for a large number of activities, ranging from breeding chicken in farms (feeding, watering, airing, etc.) to slaughtering and packaging poultry meat, to accepting

and executing dedicated packaging orders, and finally to delivering the end-products to the selling points (i.e., supermarkets).

Discussion on how to utilize process mining techniques and models led to the decision to investigate the following cases, provided that there is enough information in data logs and this information can be filtered and cleaned to enable experimentation (initial investigation provided evidence that this is feasible): - Deliveries of products – routes of lorries - Mill operation that produces food for breeding chicken in the farm - Other case-study based on data logs.

The frequent communication and close collaboration with Paradisiotis evolved into a strategic partnership that led to the creation of a joint proposal between members of the consortium of DESTINI (CUT, SAPIENZA) and Paradisiotis on a national call (CO-DEVELOP) from RIF (Research and Innovation Foundation of Cyprus), which aims into bridging the gap of Academic institutions with Industry.

The abstract of the proposal is the following:

SMART-PARADIS aims at establishing a collaboration between the Cyprus University of Technology as the main research partner, and Paradisiotis Group, a poultry meat production enterprise, as the corporate partner and end-beneficiary of the project, supported by Sapienza University of Rome acting as external research partner, for transferring new and innovative knowledge and expertise between the partners, and allowing challenging problems within the specific business domain to be tackled. Collaboration activities include trainings, workshops, brainstorming, staff mobility & exchange, and hands-on experience development, as well as sharing of technological resources and infrastructure. Latest innovative technologies in the areas of smart data processing, process mining and blockchain will enable addressing specific business priority areas in the relevant working environment, and meeting specific needs and challenges, such as reducing chicks' mortality rate, improving waste management, optimizing delivery routes, lowering fuel consumption and maintenance costs, and

linking energy consumption with breeding conditions. This project will contribute to bridging the gap between academia and industry in Cyprus, and at the same time produce innovative results that will benefit the participating enterprise, as well as other similar stakeholders. The targeted priority areas are aligned with main pillars of the Smart Specialization Strategy of Cyprus, such as food production, health & quality of living, and energy preservation. The outputs will allow the enterprise to increase its competitive stand and pioneer in technology related to its line of business, which in turn will result in better products with positive effects on public health, increased productivity and lower costs, and energy preservation. The research partners will also be benefitted as they will be able to excel their research portfolios and perform applied research offering solutions to real-world problems and connect better with the industry and market.

2.2 SEWERAGE BOARD OF LIMASSOL

1. Profile

The Sewerage Board of Limassol is responsible for the construction, operation, and maintenance of the central sewerage system for the collection and treatment of municipal wastewater of the central Limassol area, as well as the construction of the basic infrastructure of the stormwater drainage system.

2. Potential fields of collaboration

SBLA as a stakeholder of DESTINI can adopt the knowledge and expertise acquired through the project in regard to the technologies of IoT, Digital Twins, Smart Data Processing in order to develop predictive maintenance techniques for enhancing the monitoring of the sewerage system and ultimately optimize the maintenance strategy around the sewerage system.

Strategic partnership will be established on the grounds of utilization of the expertise acquired in DESTINI and its application to solve existing problems at SBLA, such as the ones mentioned above. In this respect, proposals will be prepared for submission under national calls (RIF, Structural Funds of Cyprus), as well as regional (Interreg Greece-Cyprus, Interreg-Med) for addressing process optimization, decision support for proactive maintenance and detection of leakages.

Such applications shall lead the way for future collaboration between the consortium of DESTINI and SBLA.

2.3 Water Development Department of Limassol

1. Profile

The Water Development Department (WDD) is responsible for the protection and sustainable development as well as the rational management of the water resources of Cyprus, in accordance with European and National legislation and within the framework of the Government water policy in force from time to time. The Department is invited to fulfil a number of objectives covering a wide spectrum of actions whose main axes are the following: ensure the maximum possible satisfaction of water requirements for all uses; encourage the effective use of water resources and secure the quality and protection of water sources and the water environment.

2. Potential fields of collaboration

Discussions took place in November of 2022, where the consortium of DESTINI, in collaboration with faculty from Neapolis University of Paphos, visited the water development department of Limassol, with the scope of pursuing future collaboration.

An introductory presentation took place, where the consortium of DESTINI introduced the idea of Digital Twins to the personnel of the WDD, followed up by presenting a similar project regarding a digital twin of water pipelines. WDD was very satisfied with the results of the previous project, and showed a tremendous interest for a similar implementation, due to the problems that they face on their network supplying water to Water Board Councils in Cyprus. Specifically, they have difficulties identifying malfunctions and leaks in the network, leading to problems such as waste of water resources, and even cut-offs of the network until the problem is identified and resolved. In this context, the idea expressed was the installation of IoT sensors to the most crucial pipelines of the network in order to facilitate monitoring on the water network in general, and develop and implement predictive maintenance strategies. All these would be feasible with real-time data

acquisition, and visualization using a Digital Twin. The main issue identified thus far is that the pipe network is vast, it covers long geographical distances and is located in difficult terrains and inaccessible areas. Therefore, technology for detecting early and accurately any damages or leakages to the network is of paramount importance.

Lastly, the collaboration is currently postponed due to the fact that the organization cannot fund this operation. Thus, the two organizations are seeking relevant calls for proposals in order to submit the idea, and possibly get funding and implement the project, which would possibly have a huge impact on the local society. Again, national and interregional calls are the first priority for submitting a proposal, followed by Cyprus' structural funds.

2.4 LIMASSOL MUNICIPALITY

1. Profile

Limassol Municipality is a governmental entity which is responsible to provide public services within the geographic area of Limassol, such as law, cultural, traffic police, cleaning, etc, to the citizens of Limassol. Limassol is a city on the southern coast of Cyprus and capital of the district with the same name. Limassol is the second largest urban area in Cyprus after Nicosia, with an urban population of 183,658 and a metropolitan population of 239,842.

2. Potential fields of collaboration

- Transformation of the city of Limassol into a Smart City, using cutting edge technologies such as machine learning, Digital Twins and Blockchain, combined with smart data processing and systems of deep insight. Each technology will contribute to the municipality's strategic plan and DESTINI's objectives as follows:
 - Digital Twins

Monitor of the Smart City as an entity, using IoT devices for different sectors, such as traffic management, energy conservation, safety measures, etc.

- Blockchain

Using blockchain, the City can assure the interoperability, immutability and security of crucial data. Blockchain layers can be applied to almost any developed software system.

- Smart Data Processing

Smart data processing techniques will be used where applicable, making the processing of the data more efficient, optimizing processes and reducing energy consumption of energy-intensive machinery or services. Special attention will be given to the environment as well. Indicative example is the routes and timetables of garbage collection to avoid causing traffic jam to the city center and optimize routes to save fuel.

2.5 OKYPY - State Health Services Organization of Cyprus

1. Profile

State Health Services Organization is the backbone of the National Health Care System of Cyprus, aims to offer the highest quality of healthcare to the citizens of Cyprus. The organization has 7000 personnel including more than 700 doctors, 1350 beds in 9 hospitals, 38 primary health care centers, mental Health hospital and clinics and the ambulance emergency response service covering all of Cyprus. SHSO is constantly seeking ways to upgrade their services, enhance their facilities, medical equipment, and abilities of their staff. The organization is collaborating with Academic and Scientific Institutions of Cyprus and abroad, and participates in research and training programmes.

2. Potential fields of collaboration

OKYPY is in need of adopting technologies that will make the emergency management quicker, in a way to respond to emergency cases faster, more efficiently, and able to identify the significance of the cases in order to set priorities regarding the emergency response. Additionally, by optimizing the emergency processes can significantly contribute to the reduction of emissions of the ambulances as they will ultimately follow optimal routes to handle the cases.

In this context, discussions have begun in March of 2022 with the support of a faculty at CUT that is collaborating with OKYPY very closely the last 2 years. The consortium of DESTINI and OKYPY attempted to identify ways of collaborating together and proposing methods and techniques to achieve their goals, in a future collaboration.

The ideas that arose during discussions are first of all to make the data acquisition of the cases fast and efficient. Thus, keywords and other crucial data will be recorded along with their timestamps and will be stored in a modified data lake architecture that will index the data on ingestion using a blueprint mechanism, so as to make the data extraction faster and more efficient. In addition, business process mining techniques will be applied to the recorded logs, in order to discover the process models that is currently being followed, identify bottlenecks, and enhance the process model aiming to optimize the whole operation. Additionally, the BPM system will be coupled with blockchain for securing the data, have transparency and the ability to trace back the procedures.

Currently, we are seeking for National/European calls in order to submit a proposal regarding this topic, and receive funding to allow the further exploration of the capabilities of this collaboration and the implementation of these ideas.

2.6 SOFTONE

1. Profile

SOFTONE is a leading group of business software companies, focused on the development, provision and support of ERP & CRM solutions, Cloud & Mobility services, Professional Accounting solutions, Electronic Invoicing & EDI services. Today, SOFTONE GROUP employs 320 technology experts and industry professionals. The company's award-winning applications and solutions are used by more than 47,000 businesses and are supported through a Network of 600 partners in five European countries. Being one of the first software vendors in Europe to offer its ERP solution as a cloud service (SaaS), SOFTONE GROUP is the undisputed leader of the Greek Cloud ERP market and a decisive player in Southeast Europe with more than 4,500 Software as a Service installations.

2. Subject / Short Description

Collaboration between the consortium of DESTINI and SoftOne has been established in 2019, at the beginning of the project, where SoftOne was signed as a stakeholder of DESTINI. Since then, the two groups have frequent meetings, mainly facilitated via teleconferencing due to the COVID-19 restrictions, exploring the research outcomes of the project and brainstorming for applications in SoftOne's line of business.

Recently, on July of 2022, the rector of the Cyprus University of Technology (Panayiotis Zafiris) and the CEO of SoftOne Cyprus (Panos Martinis) have formalized this partnership through the signing of a memorandum of understanding that aims at strengthening the university's efforts to link with the academia and industry, by transferring technological know-how on new technologies identified from research, from the academia to the industry.

This partnership will enable the hosting of events and activities, as well as the exchange of consulting and scientific services and technological expertise on fields of common interests. In addition, the two organizations will cooperate in national/EU-funded research programs.

Currently, the identified area of collaboration is Business Process Mining (BPM), explored within DESTINI, where the two parties aim to integrate on top of SoftOne services a dedicated BPM module for process optimization (cost, time, performance), or experiment with the capabilities of the technology on selected customers of SoftOne.

2.7 CYENS – CENTER OF EXCELLENCE

1. Profile

The Research and Innovation Centre on Interactive Media, Smart System and Emerging Technologies – CYENS Centre of Excellence (formerly known as RISE), empowers knowledge and technology transfer in the region. CYENS CoE is supported by the European Commission, the Republic of Cyprus and its founding Partners, the Municipality of Nicosia, the Max Planck Institute for Informatics (MPI), University College London, the University of Cyprus, the Cyprus University of Technology and the Open University of Cyprus. CYENS, as a Centre of Excellence, cultivates a culture of innovation and creativity in an inspiring environment filled with academics, researchers, creative and onward-looking people, innovators, entrepreneurs, and practitioners. The Centre operates under the moto “Inspired by Humans Designed for Humans” with the vision to produce world class research that drives innovation towards social and economic benefit while conducting excellent, internationally competitive scientific research in the areas of visual sciences, human factors and design, communication, and artificial intelligence. It sets out to meet the challenge with a total potential funding of more than 30 million Euros for the first 7 years, from a Horizon 2020 Teaming Action and multiple other sources, and a business plan for long-term sustainability and growth.

2. Subject / Short Description

CYENS is an external partner of DESTINI, where the consortium of DESTINI and personnel of CYENS are pursuing together ideas regarding the combination of interactive media and smart data processing. CYENS have been actively participating in project's activities, such as the first school of smart data processing and systems of deep insight.

Currently, the two groups are pursuing an idea in collaboration with the Ministry of Transport, Communications and Works of Cyprus. The idea is the development of a driving simulator, that will examine and enhance the driving skills of all kinds of Cypriot drivers / tourists, by simulating real time driving conditions and scenarios.

The skills that will be examined are:

- ✓ driver's reflexes
- ✓ driver's consumption
- ✓ compliance to the road signs
- ✓ driver's behavior to other drivers

The project's scope is to enhance the aforesaid skills mentioned, and ultimately improve road awareness towards the drivers of Cyprus, which would automatically reduce the road accidents.

For the implementation, members of CYENS will undertake the graphic design part of the project whereas members of SEIIS lab of CUT, will undertake the development of the digital twin model and the corresponding programming part. Finally, the two parts will be integrated together to build a full driving simulator.

2.8 ERATOSTHENES CENTER OF EXCELLENCE (CoE)

1. Profile

A new, autonomous, and self-sustained Centre of Excellence, namely ERATOSTHENES Centre of Excellence of the Cyprus University of Technology has been established through the 'EXCELSIOR', H2020 Widespread Teaming Phase 2 project. The newly established center has been created as a result of upgrading the existing Remote Sensing and Geo-Environment Lab, which has been operating within the Department of Civil Engineering and Geomatics of the Cyprus University of Technology since 2007. The vision of the ERATOSTHENES Centre of Excellence is to become a world-class Digital Innovation Hub for Earth Observation, space technology and Geospatial Information and to be the reference Centre in the Eastern Mediterranean, Middle East, and North Africa. The Digital Innovation Hub will create an ecosystem which combines state-of-the-art remote sensing, data management and processing technologies, cutting – edge research opportunities, targeted education services and promotion of entrepreneurship. In order to be dynamic and innovative, the Digital Innovation Hub will be based on two major infrastructures, which are a Satellite Ground Receiving Station and a Ground-based atmospheric remote sensing station. ERATOSTHENES Centre of excellence is paving the way for Cyprus to enter the space arena.

2. Potential fields of collaboration

The consortia of DESTINI and Eratosthenis CoE (ECoE) investigated the following topic: Big Earth Data Analytics - The smart data perspective

In this context the following were identified:

- According to **Forbes**, the first two of the **4 Top Artificial Intelligence Trends** for 2021 are:
 1. Smarter Big Data Analytics and Insights
 2. Automated Detection and Prevention
- The **vision** for ECoE should be to **invest in smart data** and enjoy the benefits of a

proper smart data environment

- The vision may be realized through a **two-stage process** and objectives
 1. Short-term: Cover immediate needs for the project to progress smoothly
 2. Mid- to Long-term: Set up a new research unit for smart data that will horizontally support the application areas

Short-term: Boosting ECoE's current plans

- Setup and develop smart data solutions for local stakeholders (Limassol Water Board, Sewerage Board of Limassol-Amathus → new potential case-studies or projects for water supply and rainwater management)
- Data acquisition and visualization enhancements: Real-time processing, integration with open/linked data, co-exploration of crowd-data (e.g. sentiment analysis on Twitter or Facebook)
- AI / ML models and algorithms: Predictive analytics, decision support, development of tailored models to solve particular problems (e.g. deep learning NNs)
- Integration with latest technologies like DT, visual or workflow DB querying, etc.

Mid- to Long-term: Smart Earth Data Research Unit (SEDRU)

- will be involved with the collection, storing, management, processing, visualization and analytics of earth data → induce smartness into data
- will transform smart data into useful insights via intelligent algorithms and techniques
- will be responsible for setting up and evolve the required underlying infrastructure, both at software and hardware level (including networking), which will facilitate and support the aforementioned data-oriented activities.
- will be positioned horizontally below the rest of ECoE's units so as to provide different services across the various research disciplines of the centre

The consortia agreed to strengthen their collaboration by establishing a direct and regular communication channel that will allow them to investigate funding opportunities in the future.

2.9 Aratos Group

1. Profile

Aratos Group of Companies was founded in 2003 in Greece, and was among the first companies in Europe to introduce value-added downstream services to every day people, by delivering tailor made products, designed on user needs and specifications.

2. Potential fields of collaboration

Aratos Group during the last year of the project is one of the main external partners of DESTINI. During the collaboration, the two groups worked together on submitting three (3) proposals for the European Commission (PNYX, AGORA2, BLOCKCHAINED), and one proposal in the context of INTERREG-MEDITERRANEAN (Interreg-MED). In addition, the president of Aratos Group visited Cyprus, twice in 2022, to discuss additional fields of collaboration which include:

- Space Technologies
- Healthcare
- Blockchain
- IoT & Digital Twins

Furthermore, the collaboration continues with members of the Aratos group of companies per field as follows:

Aratos Maritime

- ✓ Smart Maritime Applications
- ✓ Blockchain
- ✓ NFC
- ✓ Digital Twins
- ✓ Digital sampling for bunkering

Aratos Medica

- ✓ Blockchain
- ✓ NFC

Blockchain 2050

Development of a white-label platform to issue digital certificates stored in the blockchain for organizations: “Blockchain Certificates”

2.10 Deputy Ministry of Shipping Cyprus

1. Profile

The Deputy Ministry of Shipping Cyprus aims at safeguarding and further developing Cyprus shipping as a safe, socially responsible and sustainable industry, for the enhancement of the national economy and the creation of new jobs, specialization and expertise in the sector. The vision of the Ministry is to consolidate Cyprus’ position as an advanced maritime cluster encompassing the full range of shipping and shipping-related services and a top quality, competitive, sovereign registry.

2. Potential fields of collaboration

CUT, on behalf of the DESTINI consortium, organized a meeting with the deputy minister and presented the project and its outcomes thus far. The contribution of smart data processing in the Maritime sector was demonstrated through various case-studies and examples, including digitization of the maritime sector, decision support models for optimization of processes, visualization and analytics, as well as smart platforms for predictive maintenance. The deputy minister was very pleased to see the potential of academic and research partners engaging with maritime companies and tackling challenges of this business domain. He expressed his strong interest and commitment to pursue together with the consortium of DESTINI future collaboration in the form of a strategic partnership, introduction to shipping stakeholders and submission of proposals for ICT related maritime applications.

In particular, the following axes were defined for the future:

- Collaboration on national and European proposals for shipping and Maritime
- Collaboration on national projects for the maritime sector of Cyprus
- Application of technology and expertise acquired during the project on Cyprus maritime applications

3. Conclusions

This deliverable is a part of work package 4 and reports the main strategic partners and stakeholders that were identified in the course of the project, as well as a description of the plans for future collaboration for each one of them. In total, twenty-eight (32) stakeholders, and strategic partners joined DESTINI's consortium in effort to investigate future partnerships, those including universities, organizations of the public sectors or companies identified during the project period that align with the research interests of DESTINI, in which the consortium could pursue additional projects or collaboration in the future. The outcomes of these efforts are outlined here, concentrating more on tangible results produced in the form of memorandums or proposals that were prepared and submitted in specific national or European calls, or on fruitful prospects with policy making bodies, such as the Deputy Ministry of Shipping. The consortium is certain that the strategic partnerships will result in significant benefits for both the participating universities and the collaborating stakeholders.