D10.2 Market Analysis

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[1] **R**=Document, report; **DEM**=Demonstrator, pilot, prototype; **DEC**=website, patent fillings, videos, etc.; **OTHER**=other

[2] **PU**=Public, **CO**=Confidential, only for members of the consortium (including the Commission Services), **CI**=Classified, as referred to in Commission Decision 2001/844/EC

Modifications Index	
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01/03/2023	0.1 ToC and initial content
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20/05/2023	1.0 Complete version of Deliverable 10.2

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ACRONYMS AND ABBREVIATIONS

AIM	Application Infrastructure Middleware
API	Application Programming Interfaces
ARPU	Average Revenue Per User
CAGR	Compound Annual Growth Rate
CC	Climate Change
CH	Cultural Heritage
CI	Critical Infrastructure
DSS	Decision Support System
GUI	Graphical User Interface
HRAP	Holistic Risk Assessment Platform
HT	Hygro-Thermal
IOT	Internet of Things
IT	Information Technology
KER	Key Exploitable Result
PESTLE	Political, Economic, Social, Technological, Legal, Environmental
PSIM	Physical Security Information Management
SaaS	Software-as-a-Service
SDO	Standards Developing Organization
SME	Small and Medium-sized Enterprises
SWOT	Strengths, Weaknesses, Opportunities, Threats

Table of Contents

Executive Summary

Deliverable D10.2, namely “Market Analysis”, documents the work undertaken in Task 10.2 “Exploitation Implementation – Route to Market”.

The deliverable presents a detailed market analysis of the main Key Exploitable Results (KERs) of the project, as emanated in the HYPERION Exploitation and Business Plan (see D10.5). In particular, the study focuses on the market uptake and replication of KERs 5-8, which are cutting-edge software solutions aiming to assist Cultural Heritage (CH) operators and city managers towards increasing the resilience of their critical infrastructure and CH assets. The first step of the market study pertains to the identification of the project’s mission, vision, and value statement from a branding point of view. Subsequently, a comprehensive stakeholder analysis is conducted for each KER, including the establishment of target market, stakeholders maps & roles, and early adopters of the solution. The commercialization potential of each result is further assessed by analyzing market trends (both EU and global markets) and listing a set of competitive products/firms as well as KER weaknesses and strengths. Finally, thorough SWOT (Strengths, Weaknesses, Opportunities, Threats) and PESTLE (Political, Economic, Social, Technological, Legal, Environmental) analyses are conducted for the HYPERION Integrated Solution (KER 8), which reflects the final outcome of the project.

1 Introduction

1.1 Background

Deliverable D10.2 “Market Analysis” summarizes the work undertaken in Task 10.2, namely “Exploitation Implementation – Route to Market”. Market analysis is the process of researching, evaluating, and interpreting data related to a specific market, industry, or product. It is used to understand the trends, challenges, opportunities, and competitive landscape of a market. Market analysis can be conducted for a variety of purposes, such as identifying potential new markets or opportunities, determining the viability of a new product or service, assessing the potential impact of a new competitor, or identifying potential risks or threats to an existing business.

1.2 Scope and objective

The overall purpose of Task 10.2 is to test the market uptake and replication of the HYPERION Key Exploitable Results (KERs) 5-8, as defined in the HYPERION Exploitation and Business Plan (D10.5). The research studies presented in Deliverables 10.2 and 10.5 shall be considered as complementary to each other; throughout the project lifetime, draft exploitation roadmaps were developed by the Consortium, which were then assessed and refined based on the input received from the market analysis. Moreover, D10.2 interacts with all other project activities, as it is fed by the developments and research done by the Consortium in every Work Package. In brief, the main objective of D10.2 is to:

- Delineate the HYPERION mission, vision, and value statement from a branding point-of-view.
- Perform comprehensive stakeholder analysis (roles and maps) for each KER.
- Identify the relevant industries and highlight market trends based on EU and global market studies.
- List the main competitive products/firms for each KER, as well as their weaknesses and strengths.
- Conduct SWOT (Strengths, Weaknesses, Opportunities, Threats) and PESTLE (Political, Economic, Social, Technological, Legal, Environmental) analyses for the HYPERION Integrated Solution (KER 8).

1.3 Mission, vision, and value statement

In marketing, branding work refers to the process of creating and promoting a brand. It involves developing a brand strategy that encompasses the brand's positioning, messaging, visual identity, and overall personality. Even in the context of a research project, such as HYPERION, the “brand” is an asset to be defined, worked on, and promoted. Branding is closely tied to a company's mission, vision, and value statements. By aligning the brand's identity with these core statements, a company can create a consistent message and image that resonates with its target audience. In particular:

- The mission statement outlines a company's purpose, goals, and objectives. A brand's identity is often shaped around its mission statement to create a consistent message and image.

- The vision statement determines how the project will move forward. A vision describes how you want consumers to perceive your brand in the future. It is an aspirational statement of HYPERION's ambition and long-term purpose.
- The value statement outlines a company's guiding principles and beliefs. A brand's identity should reflect those values to create a connection with its target audience.

Mission: HYPERION's mission is to leverage existing tools and services (e.g., climate/extreme events models, and their impacts, decay models of building materials, Copernicus services, etc.), novel technologies (terrestrial and satellite imaging for wide-area inspection, advanced machine learning, etc.) to deliver an integrated resilience assessment platform, addressing multi-hazard risk understanding, better preparedness, faster, adapted and efficient response, and sustainable reconstruction of historic areas.

Vision: HYPERION aspires to provide state- and beyond-state-of-the-art tools and methodologies that improve the resilience of Cultural Heritage (CH) sites and their surrounding economies. Ultimately, the vision of the project is to develop a holistic solution that allows the virtual representation (or the "digital twin") of any CH community and the quantitative simulation and assessment of its underlying processes.

Values:

- Responsibility
- Integration
- Equality
- Transparency
- Sustainability

2 KER Market Analysis

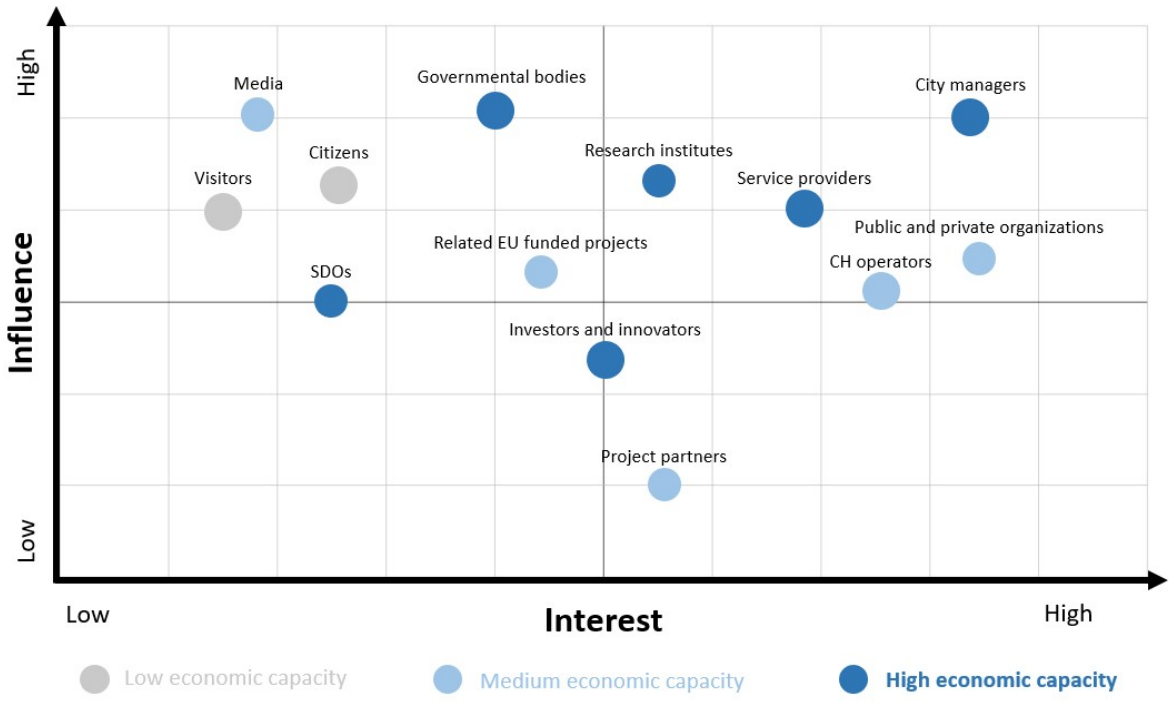
This section presents a detailed market study on the HYPERION KERs 5-8 (see D10.5 for KER description), which are considered to possess the highest exploitation potential. The study includes market size, trends, competitive analysis, target market and early adopters. Specifically for KER 8 (i.e., the HYPERION Integrated Solution), which reflects the project's ultimate outcome, several regulatory and economic factors are also presented by means of SWOT and PESTLE analyses.

2.1 KER 5

KER 5: Middleware and Data Fusion (DF) services
Target Market
The target market comprises governmental and private organizations that are interested in integrated Data Management Systems to incorporate the acquisition, processing, and storage of data coming from multiple information systems and available sensor networks. Herein, we refine the draft Stakeholder Analysis that was conducted during the development of the Exploitation and Business Plan (see Deliverable D10.5) to accommodate the new knowledge gained during the last phase of the project (i.e., from the pilot demos, exploitation workshops, market analysis, end-users' engagement). Stakeholders are categorized and mapped according to various perspectives including their geographical broadness, domains, type of activity, interest in the portfolio of results, and level of influence. In particular, the following stakeholder groups have been identified for the Middleware solution: 1. CH operators 2. City managers 3. Service provides (innovation platforms & clusters) 4. Public and private organizations that utilize sensor, satellite, machinery data 5. Citizens 6. Visitors 7. Media 8. Research institutes, technological centres, universities 9. Project partners 10. Related EU funded projects 11. Investors and innovators 12. Governmental bodies 13. Standards Developing Organizations (SDOs)

Role	Stakeholders
End-user	• CH operators • City managers • Service provides (innovation platforms & clusters) • Public and private organizations that utilize sensor, satellite, machinery data
Promotion	• Citizens • Visitors • Media • Research institutes, technological centres, universities • Project partners
Funder	• Related EU funded projects • Investors and innovators
Regulation	• Governmental bodies • Standards Developing Organizations (SDOs)

Stakeholders Role



Stakeholders mapping

Early adopters

The stakeholders that can be directly favored by the KER are city managers, service providers, CH operators, and public and private organizations dealing with the continuous monitoring and control of important assets. During the HYPERION project, a range of cutting-edge device planes and sensors (e.g., data cubes, weather stations, smart tags) were installed and comprehensively handled by the Middleware during the demos. Thus,

the city operators and managers of four pilot sites, i.e., the cities of Tønsberg, Venice, Granada, and Rhodes, could serve as early adopters of the Middleware solution. Other early adopters are related to the Critical Infrastructure industry (e.g., road infrastructure or oil refinery facilities) and can be reached through CYRIC's commercial networks.

Market trends

The global Application Infrastructure Middleware (AIM) market reached a value of US$ 47.5 Billion in 2021. Looking forward, IMARC Group[3] expects the market to reach US$ 83.1 Billion by 2027, exhibiting a CAGR of 9.7% during 2022-2027. The growth in the market is mainly due to the companies rearranging their operations and recovering from the COVID-19 impact, which had earlier led to restrictive containment measures involving social distancing, remote working, and the closure of commercial activities that resulted in operational challenges.

The shift of manufacturing companies towards Industry 4.0, which emphasizes automation, interconnectivity, real-time data analysis, and machine learning, is anticipated to impact the middleware software market positively in the forecast period. The Industry 4.0 concept encompasses cutting-edge technologies such as the Internet of Things (IoT), machine learning, cloud computing, cyber-physical systems, and cognitive computing, which are incorporated into computer systems and automated machines like robotics. To integrate these platforms and technologies with their business processes and operations, manufacturing companies require middleware software. Therefore, the widespread adoption of these latest technologies by manufacturing firms is propelling the growth of the AIM market.

Additionally, the rapidly growing acceptance of cloud computing services in various industries is fuelling the market's expansion. Middleware solutions are deployed in organizations to convert existing and complex applications into Software-as-a-Service (SaaS) solutions. Furthermore, the widespread utilization of Internet of Things (IoT) devices is providing a boost to the market growth, as it assists in migrating and restructuring crucial customer-focused applications and assets with improved integration and coordination. The market growth is also being influenced by the advanced enterprise mobility, data security and management of remote devices and databases being offered by AIM products.

Finally, the coronavirus disease (COVID-19) led to a significant increase in the requirement of middleware solutions for operating application programming interfaces (APIs) and other digital and distributed infrastructures. Other factors, including the increasing deployment of wireless 5G networks, along with significant improvements in the information technology (IT) infrastructure, are anticipated to drive the market toward growth.

The global AIM market is segmented[4]:

- By Type: Communication Middleware, Platform Middleware, Integration Middleware, Others

[3] https://www.imarcgroup.com/application-infrastructure-middleware-market

[4] https://www.thebusinessresearchcompany.com/press-release/middleware-software-market-2022#:~:text=The%20global%20middleware%20software%20market,(CAGR)%20of%206.6%25.

- By End-User: Retail, Healthcare, Automotive, BFSI, Others
- By Enterprise Size: Small and Medium Enterprises (SMEs), Large Enterprises
- By Deployment Type: Hosted, On-Premises
- By Geography: The regions covered in the middleware software market report are Asia-Pacific, Western Europe, Eastern Europe, North America, South America, Middle East, and Africa.

Market Competitors

Data Management Systems

Competitors:

- Microsoft Incorporation
- Oracle Corporation
- IBM Corporation
- Fujitsu
- Red Hat
- Unisys Corporation
- Axway Inc.
- Tibco Software, Amazon, SAP SE, Cisco Systems
- Salesforce
- Tibco Software
- Hitachi
- Google
- Alphabet
- PTC
- SAP SE
- General Electric
- Siemens
- SPS Communications
- HPE
- Bosch
- Software AG
- International Business Machines Corporation
- PANOPTIS project (H2020)
- HERON project (H2020)

Strengths of KER:

- Supports data acquisition from the innovative smart tags, which are low-cost sensors that do not intervene on the CH or non-CH building/asset (no drills, anchors, etc.)
- The data management is not limited on sensors but also comprises vulnerability/hazard assessments, numerical simulations, community engagement features, etc.
- Enhanced Data Fusion services for weather forecasting studies, HT simulations, structural models, etc.

Weaknesses of KER:

- The competitors are leading companies on the Middleware Software Market with high market share and reputation
- Existing Middleware solutions have large communities that support and guide new users
- The HYPERION Middleware currently does not offer a GUI

2.2 KER 6

KER 6: Social Participatory Mobile Application

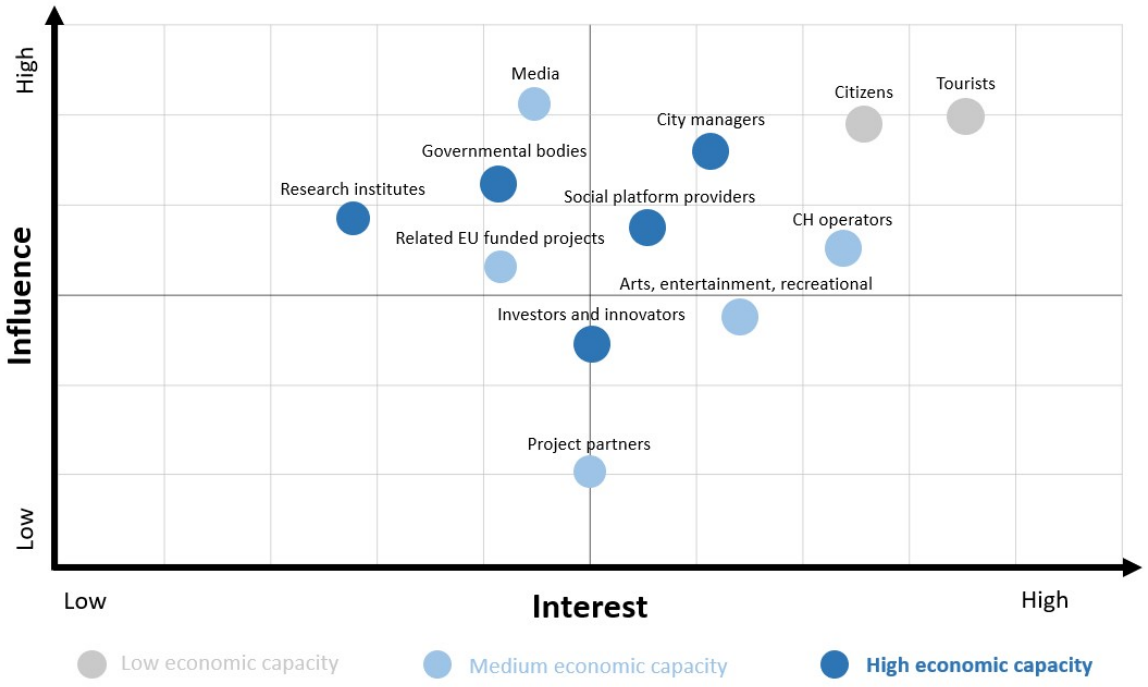
Target Market

The target market mainly involves the general public (i.e., citizens and visitors) and the operators and managers of CH sites. The draft Stakeholder Analysis presented in Deliverable D10.5 is updated herein to accommodate the new knowledge gained during the last phase of the project (i.e., from the pilot demos, exploitation workshops, market analysis, end-users' engagement). Stakeholders comprise parties that will be affected by operations, objectives**,** and results of the deployment of the Mobile App. In particular, the following stakeholder groups have been identified for the KER:

1. Citizens
2. Visitors
3. CH operators
4. City managers
5. Arts, entertainment, and recreation services providers
6. Social platform providers
7. Media
8. Research institutes, technological centres, universities
9. Project partners
10. Related EU funded projects
11. Investors and innovators
12. NGOs
13. European and international agencies
14. Governmental bodies
15. Policy Makers, International & National Organisations (e.g., cultural ministries, UNESCO)

Role	Stakeholders
End-user	• Citizens • Visitors • CH operators • City managers • Arts, entertainment, and recreation services providers • Social platform providers
Promotion	• Media • Research institutes, technological centres, universities • Project partners
Funder	• Related EU funded projects • Investors and innovators • NGOs
Regulation	• European and international agencies • Governmental bodies • Policy Markers, International & national organizations

Stakeholders Role



Stakeholders mapping

Early adopters

During the project plenary meetings and pilot demos, several stakeholders, students, and visitors were engaged to download and use the Mobile App, showcasing a promising public acceptance of the KER. As a result, we believe that the citizens and visitors of the four demo sites of HYPERION can play the role of early adopters, providing considerable and candid feedback for the refinement of KER's future releases, as well as the associated means of distribution, service, and support. Moreover, the involved project partners can facilitate the promotion and dissemination of the app through their social and commercial networks. The target market of early adopters is defined by collecting the following pre-COVID-19 statistics:

- Rhodes: 5,540k tourists and 50k citizens
- Venice: 12,950k tourists and 260k citizens
- Tønsberg: 500k (approx.) tourists and 56k citizens
- Granada: 2,001k tourists and 232k citizens

Market trends

The value of the worldwide social networking app market was estimated at USD 39.7 billion in 2021 and is projected to experience a 23.6% Compound Annual Growth Rate (CAGR) from 2022 to 2030[5]. This growth can be attributed to the increasing demand for 5G

[5] https://www.grandviewresearch.com/industry-analysis/social-networking-app-market-report

technology globally as well as the popularity of personalized feed-based apps in Europe. Additionally, the growing interest in encrypted and self-destructive messaging-based social apps in India and the rising demand for video chat services in Saudi Arabia are driving the expansion of the market. Finally, the ease of access to in-app purchase-based social networking apps is further increasing the adoption of these applications worldwide. However, concerns about data security may impede the growth of the industry.

The widespread implementation of national lockdowns due to the COVID-19 pandemic significantly impacted the global supply chain of numerous businesses worldwide. The ease of in-app purchasing of social services and the sudden shift of consumers to software as a service-based apps greatly increased the demand for social networking apps. The discovery of online communities for theatre, sports, art, music, games, and yoga saw a surge during the pandemic. The growing popularity of live streaming videos and the rise in the use of over-the-top (OTT) platforms in India further fuelled the growth of the market.

According to Hotelmize[6], 74% of the travellers around the world use social media during their vacations. In 2019, social media users kept generating a travel-related hashtag search volume of 1 million every week. Social media have also become a vital part of tourism companies' strategic operations, with a 72% increase in usage during the COVID-19 pandemic. While tourism-based businesses employ a variety of methods to reach their target audience, the International Tourist Research Centers report that 88% of them actively use social media to advertise destinations and offerings, and gauge consumer attitudes.

The travel industry continues to be the most engaging industry on Instagram, with an average engagement rate of 1.41%. On the other hand, Twitter has an engagement rate of 0.04%, TikTok 8.74%, and Facebook 0.27%. The spike in TikTok travel posts highlights its potential usage by the heritage tourism industry in promoting CH sites, events, and business offers. Paid advertisements are still the preferred social media marketing tactic for travel marketers, and the most attractive platform is Facebook. According to recent research, almost 80% of travel marketers use Facebook to launch paid ad campaigns to achieve a range of goals, from increasing awareness to boosting booking rates.

A stated by Statista[7], the total number of downloads in the social networking market was greater than 10 bill. in 2022, with an average revenue per download equal to USD 3.88. One of the key metrics to evaluate the profitability of a social media company is the Average Revenue Per User (ARPU)[8], which is calculated by dividing revenue by number of users in a quarter. During the third quarter of 2022, Facebook's ARPU was equal to USD 7.89, while Snap, Pinterest, and Twitter scored an ARPU of USD 2.73, USD 1.03, and USD 4.84, respectively.

The global social networking app market is segmented[9]:

[6] https://www.hotelmize.com/blog/positive-and-negative-effects-of-social-media-on-the-tourism-industry/

[7] https://www.statista.com/outlook/dmo/app/social-networking/worldwide

[8] https://www.cnbc.com/2020/11/03/facebooks-average-revenue-per-user-leads-social-media-companies.html

[9] https://www.grandviewresearch.com/industry-analysis/social-networking-app-market-report

- Based on the marketplace, the target market is segmented into the google play store, apple IOS store, Microsoft store, and others. Google play store dominated the global market in 2021.
- Based on the device type, the target market is segmented into smartphones and others. Smartphones accounted for a significant revenue share of 90.3% in 2021 and are anticipated to continue their dominance in the coming years.
- Based on revenue source, the market is segmented into advertising, in-app purchases, and paid apps. The advertising segment accounted for a significant revenue share of more than 60% in 2021.
- Based on the region, the market is segmented into North America, Europe, Asia Pacific, Central & South America, Middle East & Africa. Asia Pacific made the largest contribution in the global market of 45.3% revenue share in 2021 due to the growing adoption of social media integration in emerging economies such as China and India. Europe is projected to witness a CAGR of 28.7% from 2022 to 2030.
- Based on age demographics, the market is segmented into the following groups[10]:
    - 13-19 (13.1%)
    - 20-29 (32.2%)
    - 30-39 (22.2%)
    - 40-49 (14.4%)
    - 50-59 (9.8%)
    - 60+ (8.4%)

Market Competitors

Social Networking Services

Competitors:

- Reddit
- Meta
- Twitter
- Meet up
- Tapebook
- Tumpblr
- Viber
- Whisper
- Line
- Yubo

Strengths of KER:

- Fast and efficient geo-localization of CH sites and provision of additional information for historical assets

[10] https://www.oberlo.com/statistics/what-age-group-uses-social-media-the-most

- In-built features for the formation of virtual heritage communities to enhance the promotion and preservation of CH
- Citizens can create stories related to the deterioration of CH sites and promptly inform the pertinent operators to undertake mitigation actions

Weaknesses of KER:

- The competitors are leading companies on the Social Network Services Market with high market share and reputation
- Existing social networks and their underlying web hosting domains have been exhaustively tested under various environments and large number of users
- Mobile users might not be particularly interested in a new social platform

2.3 KER 7

KER 7: HRAP, Visualisation Environment and Decision Support System

Target Market

The target market includes public and private organizations responsible for the management, maintenance, and protection of critical sites and assets, as well as decision/policy makers interested in the risk and resilience assessment of small/large-scale regions and communities. The draft Stakeholder Analysis has been revised to include the latest information obtained during the last phase of the project, such as feedback taken from pilot demonstrations, exploitation workshops, market analysis, and end-user involvement. In particular, the following stakeholder groups have been identified for the HRAP/DSS result:

1. CH operators
2. Critical Infrastructure (CI) operators
3. City managers
4. Service provides (innovation platforms & clusters)
5. Civil protection agencies
6. Maintenance & inspection teams
7. Citizens
8. Visitors
9. Media
10. Research institutes, technological centres, universities
11. Project partners
12. Related EU funded projects
13. Investors and innovators
14. Governmental bodies
15. Policy Makers, International & National Organisations

Role	Stakeholders
End-user	• CH operators • CI operators • City managers • Service provides (innovation platforms & clusters) • Civil protection agencies • Maintenance & inspection teams
Promotion	• Citizens • Visitors • Media • Research institutes, technological centres, universities • Project partners
Funder	• Related EU funded projects • Investors and innovators
Regulation	• Governmental bodies • Policy Makers, International & National Organisations

Stakeholders Role

Stakeholders mapping

Early adopters

The project consortium has already defined a list of potential early adopters for the HRAP/DSS service, including CH operators and managers, local ephorates, and civil protection agencies. In particular, stakeholders from the four HYPERION demo cities (i.e., Tønsberg, Venice, Granada, and Rhodes) and the associated superintendents have expressed their interested in employing HRAP/DSS into their legacy systems to improve the management and maintenance of Critical Infrastructure assets and CH sites. Moreover, RG can further boost the deployment of the KER worldwide by exploiting its international network of companies belonging to the Business Continuity and Risk Management industry.

Market trends

HRAP can be classified as a Physical Security Information Management (PSIM) system, which are systems used to install and connect security devices, applications, and software controlled with the help of a single User Interface. The global PSIM market is expected to register a 21.9% CAGR in terms of revenue while in US it is expected to witness a CAGR of 34.41% during the forecast period (2019 - 2024). In terms of market value, PSIM market is expected to reach €2940 million by 2024.

As the world is shifting to work from home and adopting more digital technologies due to the outbreak of the COVID-19 pandemic, the PSIM market has seen substantial growth as various organizations are deploying security measures to protect their company and customers from security breaches and threats. The rising demand for increased control,

management reporting, and surveillance are some of the driving factors for the growth of this industry.

On the other hand, the deployment of PSIM systems also requires the use of high-tech resources and security advancements which increase the cost of the software in terms of initialization, integration, maintenance, and customer support. Moreover, the cost of updating these security systems is high, which may discourage end users to adopt PSIM solutions, especially SME businesses. Hence, these factors are expected to hinder the market growth for PSIM during the forecast period.

The global PSIM market is segmented[11]:

- By region, the global PSIM market is segmented into North America, Asia-Pacific, Europe, South America, and the Middle East and Africa. North America is estimated to contribute 32% to the growth of the global market over the forecast period.
- By end user, the market is segmented into Public Employee Union (PEU), transportation, commercial, government and defence, and others. The PEU segment accounted for the largest share of the market in 2020.
- By Deployment type, the market is segmented into Hosted and On-Premises solutions.

Market Competitors

Specialized consultants performing asset-specific or regional risk assessments (alternative solution)

Competitors:

- Research institutes and organizations providing risk consultancies
- Private companies providing physical security services
- Organizations and agencies related to the protection and preservation of CH

Strengths of KER:

- Supports the assessment of an extended list of hazards (earthquakes, climatic, material deterioration, floods) and their combination
- The enhanced visualization environment allows for the accurate 3D representation of different buildings and assets
- Enhanced situational awareness of the CH operators and city managers
- Helps decision makers to delineate comprehensive post-disaster response strategies by conducting simulations and assessments of different recovery scenarios

Weaknesses of KER:

- CH managers are often not particularly interested in such sophisticated ICT solutions
- Requires special training of the system operators

[11] https://www.prnewswire.com/news-releases/physical-security-information-management-psim-market-size-to-increase-by-usd-3-21-billion-32-growth-to-originate-from-north-america---technavio-301687731.html

- The cost of the solution might be greater than the consultancy services, especially when the system operators are interested in particular CH assets and only few risks

PSIM/CSIM (Physical Security Information Management / Converged Security Information Management) systems:

Competitors:

- AxxonSoft Inc.
- Everbridge Inc.
- Genetec Inc.
- Hexagon AB
- Johnson Controls International Plc
- NICE Ltd.
- Robert Bosch GmbH
- Siemens AG
- Verint Systems Inc.
- Vidsys Inc.
- Satways Ltd.

Strengths of KER:

- Modular and flexible application
- Enhanced risk-based assessment using data from sensors and simulations
- Specialized for resilience assessment and monitoring of CH sites
- Increased community engagement using the social participatory tool
- The competition of PSIM/CSIM systems for the protection of CH is presently low (CH operators/managers typically employ the alternative solution)

Weaknesses of KER:

- The competitors are top rank businesses with wide recognition and reputation in the market
- The existing PSIM/CSIM solutions have been tested, used, and approved by several costumers under a variety of different operational environments
- Easy-to-use and user-friendly platforms
- Extensive databases of Emergency Response Plans and Security Requirements, which will not be available in the first release of HRAP

2.4 KER 8

KER 8: HYPERION Integrated Solution
Target market
HYPERION customers are mainly the local Ephorates, the Ministries of Civilization responsible for the management and maintenance of the CH sites, the Civil Protection that takes action in case of an incident and coordinate activities between the interested parties, the tourism sector, Universities and Academia and on top of those, the Insurance Market as such which in severely adverse situations affecting local communities and businesses will be invoked and called in to finance the claims related to the incident that caused significant impact to their operations. In particular, the following stakeholder groups have been identified for the HYPERION solution: 1. CH operators 2. Critical Infrastructure (CI) operators 3. City managers 4. Service provides (innovation platforms & clusters) 5. Civil protection agencies 6. Insurance companies 7. Maintenance & inspection teams 8. Citizens 9. Tourists 10. Media 11. Research institutes, technological centres, universities 12. Project partners 13. Related EU funded projects 14. Investors and innovators 15. NGOs 16. Governmental bodies 17. Policy Makers, International & National Organisations 18. Standards Developing Organizations (SDOs)

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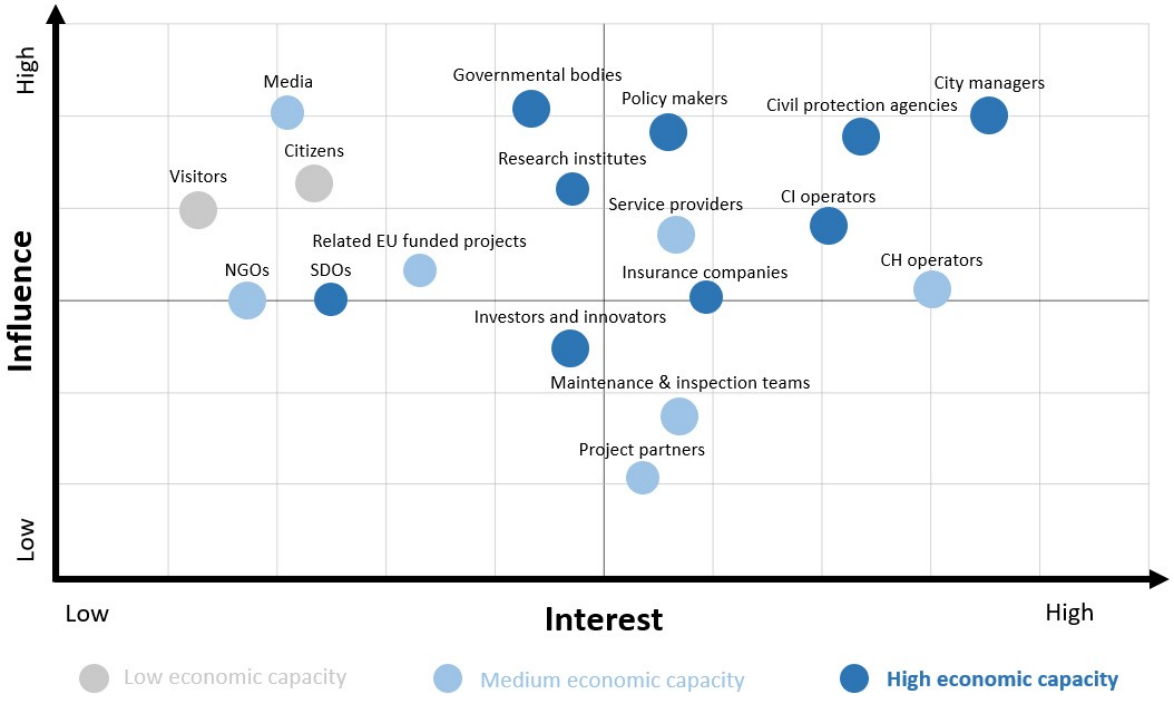
Stakeholders Role



Stakeholders mapping

Early adopters

The Customers that are most favored by the HYPERION solution are operators and municipal authorities of CH sites. For example, in Europe there are several historical cities that are continuously dealing with problems related to material degradation, weather hazards, and structural vulnerability of ancient monuments and other CH assets. One of the

early adopters of the solution could be the pilot cities of the HYPERION project, i.e., the cities of Tønsberg, Venice, Granada, and Rhodes. Outside the European Union, there are several countries that are rich of CH and have recently suffered from various CC or non-CC hazards (e.g., Bangladesh, Nepal); such stakeholders could be interested in reinforcing the resilience of their CH sites and surrounding local communities.

Market trends

The market for integrated platforms is on rise at the moment and the mindset of the stakeholders is shifting to the era where unified solutions are preferred for the preservation of historic monuments and the resilience assessment of CH communities (especially when tourism plays an important role to the local economy).

The customer segments are the following:

- Based on characteristics of the customer, a reasonable segmentation for the HYPERION solution is public and private
- Based on preferences, one segmentation could be CH operators & municipal/regional authorities, contractors & organizations that deal with environmental monitoring

Market competitors

The main competitors are specialized consultants performing hazard/vulnerability/risk assessments and on-site inspections for local/large scale regions comprising CH assets.

Strengths of KER:

- Provides situational awareness capabilities to the customers by considering all aspects of risk (hazard, vulnerability, and exposure)
- Post-event or periodic on-site inspections are implemented more efficiently and accurately with the employment of innovative ML/AI techniques
- Enhanced risk assessment studies considering the socioeconomic impacts of disasters
- Improved assistance of city operators during urban planning and risk mitigation actions

Weaknesses of KER:

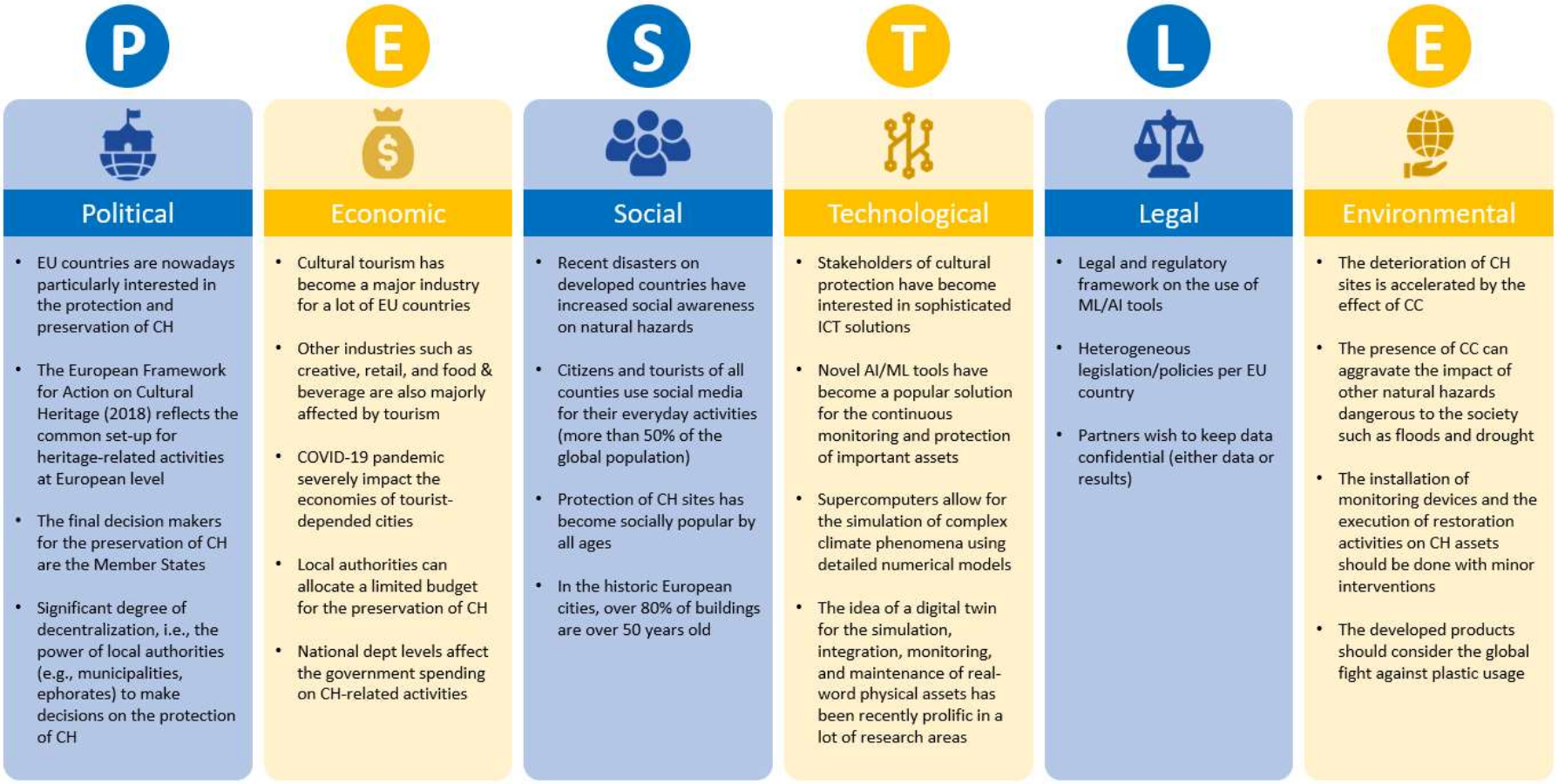
- Competitors can approach easier stakeholders who are interested only in specific hazards, e.g., for the material degradation of a specific ancient monument
- HRAP and DSS require special training of the system operators
- Higher initialization and operational cost of the HYPERION system with respect to traditional solutions, especially if the stakeholders are interested only in monitoring specific CH assets and only few hazards
- Competitors on the preservation and restoration of CH sites have well-established customer networks (e.g., national universities, engineers working for local Ephorates)

SWOT Analysis

SWOT analysis is the marketing technique to identify the Strengths, Weaknesses, Opportunities, and Threats of an organization. Identifying the internal and external strengths and weaknesses that surround HYPERION helps to achieve the set objectives and to set concrete actions.

PESTLE Analysis

The PESTLE analysis is the method for the identification and assessment of an organization's current landscape and the external factors that may influence it. PESTLE is used to evaluate the growth perspective of the project and to orientate the objectives.



3 Conclusions

A comprehensive market analysis of the HYPERION Key Exploitable Results (KERs) 5 to 8 was conducted in Task 10.2 and reported in the present deliverable. The results of the study showed that the KERs possess compelling exploitation potential, as they belong to cutting-edge industries (e.g., IoT, social media, PSIM) that are expected to grow significantly in the following years. Moreover, the KERs showcase distinct capabilities and advantages with respect to other competitive solutions and, thus, can achieve high market penetration. Finally, the SWOT and PESTLE analyses of KER 8 (HYPERION integrated solution) addressed several political, environmental, legal, etc. issues that should be taken into great consideration by the Consortium to better evaluate the project's commercial perspective and orientate its objectives.