



SMART MARINAS

NAVIGATING THE DIGITAL TRANSFORMATION

Smart infrastructure, and consequently a smart marina, is the result of combining physical infrastructure with digital infrastructure, providing improved information to enable better, faster and cheaper decision making.



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Executive Summary

The 'Smart Marinas Initiative' was introduced in light of a pressing need for the marina industry to respond to the technological developments such as digital transformation processes that enhance efficiency, and seamless user experiences across the transportation and hospitality industries. The ICOMIA Marinas Group (IMG) realised that there is clearly some considerable scope for ICOMIA to assume a global role in developing programs on crucial marina-related issues such as interconnection, data collection, and sustainability.

To kick off the process, two years ago IMG started by developing this first draft that builds the case for why marinas should work towards becoming smart, and outlines the definitions of the term 'Smart Marina'. Following the publication and feedback to this document, further work will focus on the impacts of this concept on specific areas in the marina industry, and on guidelines for how marinas can harness it.

The technology around us is evolving fast, with phenomena such as interconnectivity, data sharing, artificial intelligence integration, and seamless customer experiences taking place in all industries. Marinas begin to face increasing expectations from customers to keep up with the global pace and have to advance towards providing optimal client experience while improving their sustainability, efficiency and social responsibility. In short, they would do well to join the global trend and become smart where applicable.

At the same time, marinas are complex centers of services, having to manage a significant number of procedures, and manoeuvre between multiple parties to answer their customers' needs. All of these have to be addressed while keeping the marina profitable and sustaining the quality of service associated with it.

To address the need to become smart, it is important to understand what this means in practice. Smart marinas may be defined as interconnected boating facilities that can be easily accessible through digital platforms and physical data collection sources, while maintaining safety and data privacy, and can be enhanced by being linked to surrounding services and communities. This ultimate Smart Marina process can enable marinas to generate, analyse and utilise data to automate some of their operations, predicting future market behavior, and independently address boaters' operational needs.

The building blocks that the Smart Marina can be built upon are:

- User-centric alignment of all services and stakeholders
- Harmonisation as a means for integration
- Data collection and management
- Sustainability driven digitalisation

Once a vision for the technological future of marinas has been debated and accepted, the Working Group (WG) will start developing recommendations and guidelines for marinas as well as incentives to facilitate the generation of new tools and processes for implementing the necessary digital transformation.

Introduction

The ‘Smart Marinas Program’ was first introduced to IMG in October 2019, in light of a pressing need for the marina industry to respond to technological developments such as digital transformation processes that enhanced efficiency and seamless user experiences all across the transportation and hospitality industries. At the ICOMIA World Marinas Conference in Dubai 2021, following the challenging pandemic years, we realised that there is clearly considerable scope for ICOMIA to assume a global role in developing programs on crucial marina-related issues such as interconnection, data collection, and sustainability.

To kick off the process for the future work needed in terms of regulation, policy making, and development of best practices, IMG started by developing this first draft of the concept behind Smart Marinas and Digital Transformation, outlining the vision, and defining some basic terms. This document aims to achieve three main goals:

1. Describe the reality which requires marinas to become smart
2. Define the term “Smart Marina”
3. Briefly outline the building blocks that the “Smart Marina” concept is built upon

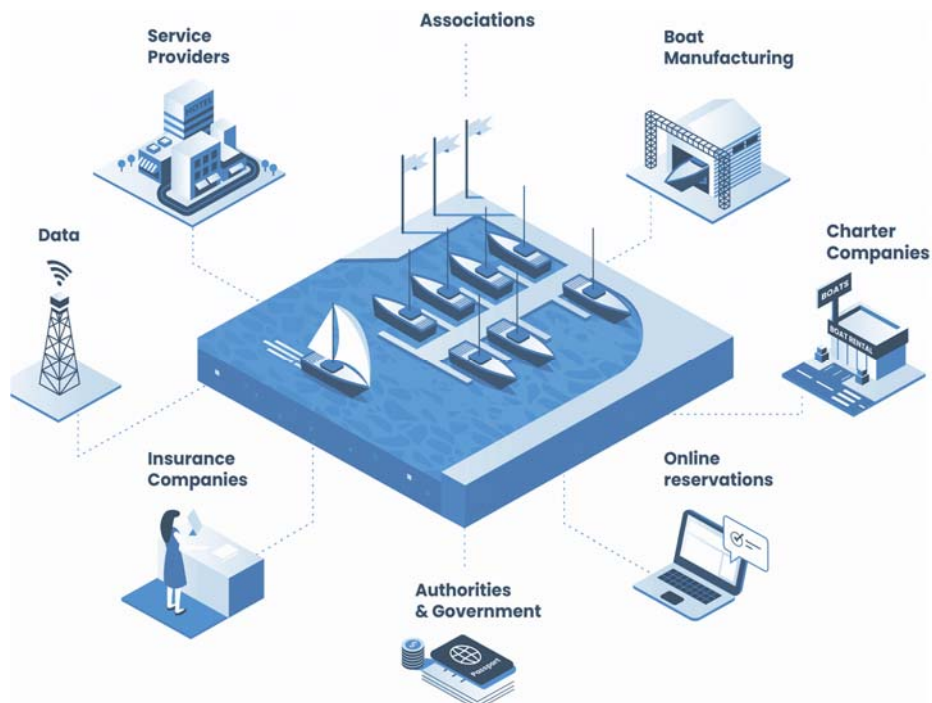
Following the publication, further work will be conducted to detail the concept into a practical plan.

The anticipated process is:

1. Define the term ‘Smart Marina’ - set the boundaries for the work.
2. Translate the vision into practical implementable aspects detailing the impact of the ‘Smart Marina’ concept on the day-to-day marina operations.
3. Offer a guideline for marinas on how to take the complex change and break it into logical understandable and implementable steps, as part of an overall roadmap.

At a period of great change around us, we invite you to have a read through this first draft, share with us your thoughts and feedback, and join us in shaping the technological future of marinas

A glimpse of the future of marinas



Easily Accessible

- Seamless and easy interaction
- Available and responsive
- Transparent
- Uniform

Interoperable

- Accessibility of multiple second tier services
- Integration in the host community

Efficient/Automated

- Reduced operational burden
- Accurate and personalised service
- Optimal utilisation of assets
- Intra-operability

Universal

- Interconnectivity with other marinas

The fast evolution of technology that requires marinas to take action

The technological reality is advancing at an accelerated pace. According to the World Economic Forum¹, the world is experiencing a fourth industrial revolution due to the rapid development of technologies such as robotics, artificial intelligence and 3D printing.

It is not a distant future, as sometimes it may seem, it happens today. Multiple systems and industries are becoming increasingly interconnected. In the aviation and the hospitality industries, harmonised processes and the aggregation of services offer seamless customer experience, enabling easy, one-click reservations and real time availability information is online. This becomes the norm all across other industries. End-to-end interconnectivity in the shipping industry allows customers to follow their packages and estimate times of arrival. Even municipalities, campuses, and buildings put in place systems and protocols that enable data collection and analysis for efficiency and optimisation purposes, with applications such as motion-activated lighting that can deliver behavioral insights, improving overall traffic intelligence. Beyond these, managing daily routine issues through the digital space and interacting with artificial intelligence (AI) are being mainstreamed, benefitting the management of data and assets.

What today seems to be groundbreaking and avant garde, tomorrow will become trivial and basic, especially in light of the evolving needs of modern societies. Expanding cities, under the burden of growing demand from modern society, require management of an ever-increasing number of people, traffic, and data. Grids are expected to withstand higher and more frequent moments of peak demand, especially with the transition to electric propulsion and energy systems (for cars, buses, trains, boats, etc.). All of this is expected to rely on big data management through digital transformation of processes and adoption of 'smart' practices.

1

https://www3.weforum.org/docs/WEF_Future_of_Jobs_2023.pdf?_gl=1*1lb4rtd*_up*MQ..&gclid=Cj0KCQjwnrmIBhDHARIsADJ5bm-ijjBbYDMtUVaiGKhwLrz130YO9LOnY3ZcvoINrUuk_DP3wcHQaAjSnEALw_wcB

The opportunity of realising greater potential in marinas

Inherently customer-facing and at the intersection of recreation and leisure, nature, sustainable transportation, and high-quality real estate, the need for marinas to respond to the evolving technology all around is substantial. While larger marina networks can leverage their size and scope to develop inhouse solutions, single marinas often deal with the challenge of employing multitude of products and services, with overlapping value propositions and whilst contending with a mounting need for staff training and coordination. But even the most innovative marinas or marina networks are struggling to harness the full benefits of an interconnected world.

A generational shift is taking place now in the recreational boating industry, with 2020 being the first year in a decade in which the number of new boat buyers in the US under 40 surpassed those over 60². The new boating generation is synonymous with tech-reliant customer habits, and expectations for easy and transparent processes. Having to send an email to purchase a service is considered by some to be cumbersome and redundant.

The need for seamlessness and efficiency stems not only from resource management considerations and the expectations of tech savvy customers, but also from the requirement to become more sustainable and minimise carbon footprint. Being at the forefront of connection between people and nature, marinas are expected to set an example and lead the way in adopting more sustainable practices. This is the expectation of their host societies as well as of their customers.

The need to advance is met with the complex reality in which marinas operate. Marinas are complex centers of services, having to manage a significant number of procedures, and manoeuvre between multiple parties to answer their customers' needs. On top of the already overburdened operational environment, marinas are facing changing global conditions that will require them to adapt and streamline additional activities. Among the challenges to be addressed are:

² <https://www.tradeonlytoday.com/industry-news/average-boat-buyer-age-drops>

- Increased regulatory requirements
- Transition to the Sustainable Blue Economy
- Climate change adaptation
- New boats with new technologies
- Rising demand with limited capacity to increase supply
- New propulsion systems that require adjusting and managing infrastructures
- New generation of boaters with different habits and demands
- Smart ecosystems (governments, cities) requiring interconnection and new skills
- Abundance of technological solutions with multiple value propositions

All these take place in parallel to already existing bottlenecks such as thin operational margins and keeping personnel up to date in light of the adoption of new tools and technologies. Nevertheless, digital transformation seems to be imminent, therefore marinas need to carefully understand their path towards becoming “smart”.

Definition of the term “Smart”

There is a constant use and multiple definitions for the term “Smart Marina”, or addition of the adjective “smart” to any physical instrument and facility in use. When applied to marina berthing and boating infrastructures, the term smart infrastructure may provide a basis for definition. The Cambridge Centre for Smart Infrastructure and Construction (CSIC) provides a definition of the term: Smart Infrastructure is the result of combining physical infrastructure with digital infrastructure, providing improved information to enable better decision making, faster and cheaper. According to CSIC, smart infrastructure can allow owners and operators to get more out of what they already have, increasing capacity, efficiency, reliability and resilience. It can help owners and operators enhance service provision despite constrained finance, growing resource scarcity and, in mature economies, short supply of green field space. In addition, better understanding of the performance of our infrastructure can allow new infrastructure to be designed and delivered more efficiently, and to provide better whole-life value.³

³ <https://www-smartinfrastucture.eng.cam.ac.uk/system/files/documents/the-smart-infrastucture-paper.pdf>

The Institution of Civil Engineers (ICE) defines it as enabling technologies such as connected sensors and big data analytics that are integrated with physical infrastructure in order to achieve real-time monitoring, efficient decision-making and enhanced service delivery.⁴

To put things in a simple way, to define some facility as smart, according to the various definitions, there is a need for the following factors:

1. **Centralised digital data collection**, through digital platforms such as software, websites, sensors, applications, etc.
2. **Analysis of the collected data** to generate relevant insights regarding operational statistics, trends, customer behavior, etc.
3. **Utilisation of the insights** to make operations more efficient and be ahead of the curve with respect to demand.

Building upon these definitions, the “Smart Marina” definition may be derived accordingly.

Marinas as an Infrastructure

Marinas are boating infrastructures/facilities responsible for multiple activities and functions arising from the process of recreational boating and berthing. They include, inter alia, berthing services; electrical charging, fueling, and water supply to the boats; waste disposal and boat maintenance; home base for boaters with showers, restrooms, storage, and necessary supplies; leisure services such as touring, car rental and hospitality; resident clubs and sport clubs; border control, and many more. Given this reality, marinas are required to operate in a wide range of fields, interacting with boaters on multiple levels, and serving as a channel for various service providers.

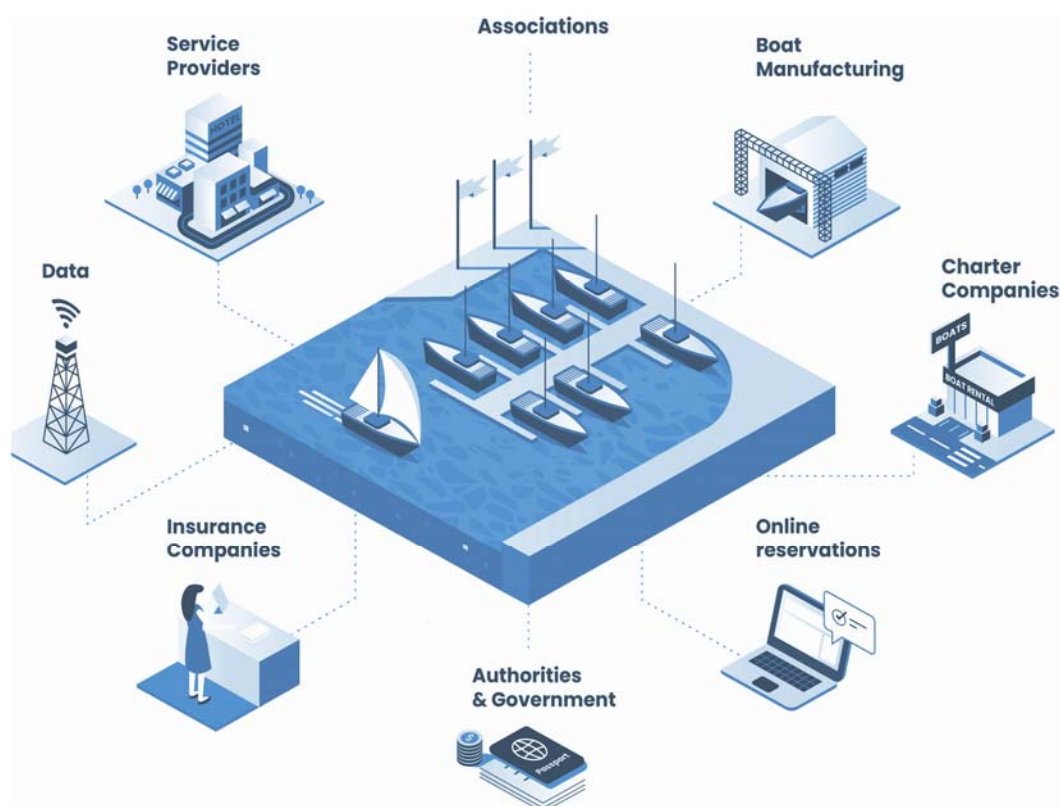
⁴ <https://www.icevirtuallibrary.com/doi/10.1680/jsmic.16.00002>

Smart Marina Concept Definition

At the core of the smart marina concept lie two main characteristics: safe data collection and management, and its utilisation for better performance for the benefit of the client.

A smart marina is a marina that is first and foremost easily accessible by boaters and other stakeholders through digital platforms and physical data collection sources, such as interconnected sensors. It optimises its operations through analysis of the collected data and adjusts them accordingly. In a broader context it is linked to surrounding services such as local community facilities, government services and external service providers, and in the ultimate scenario, smart marinas can be interconnected, building a living network that can see the wider picture of the boating activity and enable strategic thinking. All of this should be done following strict rules of privacy protection, just as in other operational aspects of the boating activity, such as credit payments information.

This complete Smart Marina concept can enable marinas to generate, analyse and utilise data to incorporate technologies that make processes and procedures more efficient, saving operational costs and freeing staff for face-to-face personal service. It can make it visible and accessible to boaters like never before, making communication seamless and immediate, and providing service quality of the highest standard. As technology is in constant evolution, this definition does not refer to any specific technology. Its interpretation into practical tools will have to be constantly re-evaluated, in light of constant technological developments.



These are the characteristics and applications of the Smart Marina concept:

Easily Accessible

- Seamless and easy interaction through various available channels and on demand, incorporating interconnected platforms that complement each other's value proposition. Customers will be able to fulfill their operational needs easily and focus on their recreational experience.
- Available and responsive through human staff, digital accessibility and automation based on digital access and machine learning. The needs of customers will be addressed quickly and easily, with optimal staff time utilisation.
- Transparent through rich and updated information, easily available on demand, across platforms. Expectation building with customers will be optimal, providing a clear picture on what they are getting from choosing a particular marina.

- Uniform through standardisation (harmonised protocols, terminology and procedures) that is coordinated among the recreational boating industry. Customers will know what to expect from reservation and check-in at every marina, going through familiar processes.

Efficient/Automated

- Reduced operational burden through automation of technical activity, interconnection of utilities and infrastructures on IoT basis, and interconnection with government and wherever is applicable, with municipal services.
- Accurate and personalised service through better boaters' customer interaction and visibility, throughout their entire journey, while maintaining privacy and high standards of cybersecurity.
- Optimal utilisation of assets through optimal visibility of supply and demand, and versatility of assets.

Interoperable

- Accessibility of multiple second tier services⁵ through interconnected systems that are able to receive and send information as necessary.
- Integration in the host community through digitally enabled transparency and accessibility not only for the boaters, but for the public as a whole. Customers will be able to address all their needs and desires more easily, through the marina.

Universal

- Interconnectivity with other marinas through harmonised protocols and procedures that will create a global network of marinas exchanging critical data and generating global comprehensive visibility of the demand.

⁵ Services not directly linked to marina activity but are relevant for the boaters' journey such as car rental, tourism, hospitality, leisure, retail, etc.

The building blocks of the Smart Marina status

Throughout the definition process of the Smart Marina concept, five building blocks were identified as key to enabling the full benefits of the process:

1. Harmonisation
2. Digital data collection and management
3. Sustainability driven digitalisation
4. User-centric alignment of all services while driving new revenue models
5. Gradual voluntary process

Harmonisation

Data needs to be collectible. When systems' components are represented in different ways, and protocols vary from marina to marina, it is impossible to put all of it together in order to generate some insights. To optimise operations, maximise revenues and provide a much more user-friendly international environment, marinas will need to work towards harmonising some processes and operational procedures. This entails the creation of a single language to represent activities and assets, and the generation of a uniform way of processing boating and other associated activity. This can create easier operations and predictability for involved stakeholders, while building foundations for innovation to take root. When boating activities are harmonised across the industry, the entry barrier and incentive for new innovative players will be lowered and existing players will be able to reach new locations and markets.

Harmonisation can also address the challenge of a multitude of platforms that need to be utilised in marina operations. The uniformity and unified languages can enable platforms to become global and address marina needs in a more holistic way, interacting well with complementing services and technologies and avoiding the current overlap in value propositions and labor burden for the staff.

Data collection and management

The next building block, in parallel with harmonisation processes, is the collection of data and its management wherever applicable. Once the communication methods and language are unified, and as a result also digitised, the collected data can be combined and analysed. The proper analysis of the information, and the following exchange and cooperation around it, can empower marinas and other stakeholders in the industry by drawing some crucial insights. The wider the circle, the deeper the insights will be. When enough data is collected and analysed, this can lead to the generation of big data, and down the line in places where applicable, to the application of machine learning and AI.

This activity will have to take into account crucial operational issues such as liability and integrity, while maintaining non-identifiability and privacy protection. The European protocol of GDPR and other equivalents can provide an adequate methodology for this.

Sustainability driven digitalisation

Smart marina development process can also embrace multiple sustainability and Blue Economy targets. Abilities such as interconnection and efficient utilisation of utilities, efficient communication with customers and service providers, better visibility of the marina's assets and activities, etc. can help marinas reduce their Greenhouse Gas (GHG) emissions and better communicate their environmental contribution to the boaters. In addition, better synergy of the marinas with surrounding communities, supported by technological means, may enable circular economy models, which have an even greater contribution potential to the reduction of the ecological footprint of the marinas.

A process towards becoming smart will also enable marinas adjusting to emerging technologies that require advanced asset management. Functions such as utilisation of renewable energy, servicing new propulsion systems, interconnection with global platforms and tapping to other industries, will rely on substantial demand visibility and optimisation.

User-centric alignment while driving new revenue models

Central to this process is the efficient alignment of all stakeholders around a purpose-driven mission to offer better, value-added customer service. This involves the deployment of existing resources as well as the addition of any new services to the marina and should remain as simple as possible for the operational personnel and complement existing tools that are in use.

This approach will also help marinas to unlock new revenue opportunities, both through saving on operational costs and inspiring new revenue sources. Systems that are aligned with a focus on the customer help prioritise investments in technology and improvements. Optimal communication with boaters makes demand more visible and with seamless data exchange with other stakeholders, new value propositions may arise. This can open the door for some new technologies to take root and offer currently untapped benefits.

Gradual voluntary process

Given the complexity of the marina operations and the challenging reality in which they operate, the process towards becoming smart should be done on a voluntary basis and gradually. The gradual process should be based on win-win cases, generated by stakeholders that see the benefit of collaboration.

Marinas and their partners should identify their priorities in the overall holistic process, and move ahead in accordance to a plan that sets the ultimate target of digital transformation. This movement forward should be done in line with a clear strategic plan and a matching roadmap, ensuring clear value for the marinas and their customers, and avoiding overwhelming the system.

The Road Ahead

Once a vision for the technological future of marinas has been debated, the next step is to define the corresponding roadmap. The Smart Marina Working Group will start developing recommendations and guidelines for marinas and their functionality within wider communities. Alongside this, the WG will also address the need for incentives, to facilitate the generation of new tools and processes for implementing the necessary digital transformation.