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| **Challenge** | **Issue** | **Suggested Action** |
| 1. **Lack of awareness and understanding of SDI**, SDI principles and the wider uses of hydrography.  | Legacy and out of date work practices; inefficiencies; reduced value for HO data; entrenched ideas of HO customer base and data security.  | Programme of awareness raising / capacity building across ALL RHCs. Enforce RHC standing agenda item on MSDI with clear objectives set (see 2). |
| 2. **No coherent strategy or funding for MSDI related activities.** | Reliance on in-kind support from a few organisations; stop-start implementation; HO community will fall further behind rest of world; charting legacy issues will remain thus stifling e-navigation and damaging HO reputation. | IHO Secretariat to develop strategy and commit to greater participation in global SDI initiatives.  Clear goals to be set for HOs to participate in national SDI initiatives and RHCs to develop and implement regional MSDIs (thus also helping to solve ENC boundary issues). |
| 3. **Lack of fundamental skills in data management and GIS.** | As 1 above.HO recruits frustration that these skills are seen as unimportant and at a lack of progress; may result in best people not joining or leaving profession. | Awareness raising (see 1 and 2); capacity building with long term support and mentoring.Include fundamental skillsets as core modules in hydrographic and cartographic training programmes. |
| 4. **Legacy datasets and work practices do not support SDI.** | HO mind sets and  workflows are entrenched in charting.Same as 2 above.     | Development of best practice through awareness raising, capacity building and training in fundamental skills (see above).  Prepare best practice documentation, advice, mentoring and participation in national SDI and regional MSDI initiatives.  |
| 5. **Multiple datasets in a wide variety of (new) formats** |  The different types of data that conform a marine environment makes them difficult to harmonize in a single combined usable way – a common platform |  Taking into consideration existing common data formats (mainly in oceanography and imagery) and leveraging the S-100 Universal Data Model to develop the basic product specifications applicable to MSDI. |
| 6. **Lack of awareness and understanding of emerging technologies** and better formats to represent dynamic marine data such as NetCDF for multi-dimensional data – related to No. 3  |  Most HOs keep their attention on the navigational aspects of their mission, they don’t know how the GIS world evolves and what’s the latest technology available that can be used in actual MSDI implementations |  The MSDI WG could be the conduit to provide information through IRCC and to the RHCs on the latest technologies and trends. Incorporating the use of technology at the Capacity Building courses – related to No. 4 |
| 7. **Hydrographic and oceanographic community is fragmented.** | Lack of cohesion, replication of effort, wasted resources, mixed messages (internal and external). | Mutually supportive programmes (e.g. between IOC and IHO) on awareness raising, internal and external, fundamental skills training and active participation in relevant initiatives (e.g. Regional MSDI and Marine Atlases). |
| 8. **Marine and maritime sectors are marginal players in global mapping and SDI initiatives.**   | All of the above. | Expert participation in global, regional and national SDI initiatives, supported by above activities.   |
| 9. **Lack of support from decision makers**: MSDI sounds “too technical” for the majority of decision makers from which HOs need to get funding and support. |  If within the HO community there is no good understanding of SDIs, that is even more critical at higher levels. When we talk about MSDIs, the approach is always of technical nature; economists and decision makers normally run away from that realm;  |  We need to get their attention in order to be able to get funding; showing the economic and social benefits of implementing the right policies and programs for a MSDI would have a positive impact on the potential HOs budgets. |
| 10. **Need to connect the scientific and technical motivations to create a MSDI to the economic and social incentives** (how the common people get the benefits?) - related to No. 2 and No. 9 |  The studies and project documents to develop a MSDI normally lack the information about its economic and social impact, this situation affects the relevance of such infrastructures that would help in building the case to actually build MSDIs.  | The MSDI WG under the CB program, to provide guidance to find current studies, what INSPIRE says about this and to develop some methodology to evaluate the social and economic impacts of a MSDI. |
| 11. **Most HOs don’t understand how they could connect with their NSDI.**  | Issue: in many cases the HO is isolated from the NSDI initiatives and comes in late in the game, not able to influence its development and only playing a limited role. | Encourage HOs to be aware of their NSDI projects, with the help of the MSDI WG, provide information about the benefits of having marine spatial data ready available as part of the overall NSDI. |
| 12. **“Not invented here” syndrome. HO’s pretend to develop all necessary products, i**nstead of enabling access to information that would allow licensees and users to create their own products and apps. | In most MSDI discussions HOs focus on the products they should provide to the user (or layers of data), is almost impossible to figure out what each individual or community would need. | Let’s focus the discussion more on the side of providing authoritative data in the best way possible and let the user decide what they want to do with it. |
| 13. ENC data could be the basis of a MSDI data layers but the **current business model to distribute this data does not suit wider use** by the non-navigational market. | ENCs are only distributed through the RENCs and VARs, but that business model is not efficient for the majority of non-navigational users that want this type of data. Because of high pricing levels and the S-63 data protection scheme, one of the most valuable assets of HOs can’t reach a broad audience beyond the traditional mariner. | The MSDI WG to explore possible business models that would benefit non-navigational users accessing ENC data as a basic layer of a MSDI. |
| 14. **HOs are reluctant to share their data**. | One key principle of a MSDI success is enabling data sharing, many HOs around the world don’t agree with the idea of sharing their data holdings; even providing data for a fee becomes too difficult. | The MSDI WG provide guidelines to MS on how hydrographic data could be shared in a MSDI and engage in discussions with the IRCC and RHCs on how HOs would like to make their data available. |
| 15. **Lack of investment per se and specifically in people skills**  | Education, education, education! Emergent HO’s will be better placed to “get it right first time” as there are fewer legacy issues | The MSDIWG provide training packages to RHC’s aimed at ALL levels of personnel in HO’s |
| 16. **Active and Passive Resistance to Change** | Sabotage of progressive ideas either explicitly or implicitly for fear of the future  | The MSDIWG provides “Change Management” coaching workshops/programmes to reduce inertia |
| 17. **Lack of understanding of the business HO’s are in** | Senior Management are often on short term postings (2-3 years) and rarely know the business |  |
| 18. **Weak leadership and Management structure** | As per 15-17 |  |
| 19. **The framework for SOLAS is extremely conservative**. IMO is very slow to adopt change so the argument for HO’s to do so has not been made | Greater urgency required in IMO Governance to bring about change  | MSDIWG to encourage a wider dialogue between IMO, GSDI and IHO  |
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