

Holistic Digital Resilience Ecosystem for Disaster and Emergency Preparedness, Mitigation and
Response: Frameworks, Toolkits, and Guidelines

Industry Connections Activity Initiation Document (ICAID)

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IC20-019-02 Approved by the CAG 14 March 2022

Instructions

- Instructions on how to fill out this form are shown in red. It is recommended to leave the instructions in the final document and simply add the requested information where indicated.
- **Shaded Text** indicates a placeholder that should be replaced with information specific to this ICAID, and the shading removed.
- Completed forms, in Word format, or any questions should be sent to the IEEE Standards Association (IEEE SA) Industry Connections Committee (ICCom) Administrator at the following address: industryconnections@ieee.org.
- The version number above, along with the date, may be used by the submitter to distinguish successive updates of this document. A separate, unique Industry Connections (IC) Activity Number will be assigned when the document is submitted to the ICCom Administrator.

1. Contact

Provide the name and contact information of the primary contact person for this IC activity. Affiliation is any entity that provides the person financial or other substantive support, for which the person may feel an obligation. If necessary, a second/alternate contact person's information may also be provided.

Name: Stefan Sauermann

Email Address: sauermann@technikum-wien.at

Employer: University of Applied Sciences Technikum Wien

Affiliation: University of Applied Sciences Technikum Wien

IEEE collects personal data on this form, which is made publicly available, to allow communication by materially interested parties and with Activity Oversight Committee and Activity officers who are responsible for IEEE work items.

2. Participation and Voting Model

Specify whether this activity will be entity-based (participants are entities, which may have multiple representatives, one-entity-one-vote), or individual-based (participants represent themselves, one-person-one-vote).

Individual-Based

3. Purpose

3.1 Motivation and Goal

Briefly explain the context and motivation for starting this IC activity, and the overall purpose or goal to be accomplished.

Digital Resilience has recently been elevated as a global priority for governments, development agencies, institutions, businesses and society at large, due to the vital and versatile role technology is playing to support the COVID-19 pandemic's response, recovery and rebuilding efforts.

Furthermore, the global disruptions caused by COVID-19 across multiple fronts have highlighted the multiple dimensions, complexities and diverse components required to create and sustain a holistic digital resilience ecosystem, which far extends the current assumption of many to only focusing on cybersecurity and the primary digital infrastructure. As a recent high-profile example, the European Commission indicated such progress, but also highlighted that access to digital tools is still uneven in its 2020 Digital Economy and Society Index.

To overcome this thinking a paradigm shift of behavioral, ethical inclusive design, financial accessibility and organizational perspective is required across multiple levels. This is to drive consideration for equal, equitable, continuous, inclusive, sustainable and secure access by governments, organizations and societies across the digital ecosystem.

These factors are becoming imperative as governments and organizations rapidly undergo digital transformation of their systems, business operations and service delivery models to improve efficiency and reduce costs, while leveraging information from machine learning and autonomous intelligent systems to improve their citizens' and customers' experiences.

This IC program aims to develop a framework that enables communities, villages, cities, regions, and countries, to deploy architectures and select standardized technologies, so they may address immediate and urgent needs during a disaster or emergency without sacrificing the long-term well-being and rights of people (their citizens, customers and users) as a result of selecting a technology that will have negative impacts on privacy or agency.

These efforts will help in bridging the digital divide across and among countries at all levels to ensure that vulnerable communities with special needs are not left behind in a progressively digital world, where services and support are increasingly based on digital awareness, literacy and access.

https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1025?pk_source=website&pk_medium=link&pk_campaign=desi&pk_content=ip

It leverages IEEE's collective portfolio and expertise to assess the current situation, identify gaps, and develop a targeted and implementable set of deliverables based on a foundational white paper, and including digital resilience profiles, ecosystem mapping, multidimensional roadmaps and standards, architectures to support adoption, while respecting principles of human rights, dignity, agency, and well-being, in critical areas including:

- i. Network and information resilience
- ii. Digital sovereignty, identity, privacy, data justice and trust
- iii. Disaster and crisis management
- iv. Food security, smart logistics, and traceability across the supply chain ecosystem
- v. Healthcare and tele-medicine
- vi. Mental wellness and addiction
- vii. Education and tele-learning
- viii. Tele-commuting and tele-working

- ix. Innovation and entrepreneurship
- x. Digital access and inclusion
- xi. Fintech, blockchain and financial inclusion
- xii. Communication and digital media

IEEE SA and other organizations already have some relevant pieces to address these important aspects, and this IC program will review relevant resources in existence or under development.

3.2 Related Work

Provide a brief comparison of this activity to existing, related efforts or standards of which you are aware (industry associations, consortia, standardization activities, etc.).

IEEE SA has a significant body of work with direct relevance to this IC program, and we intend to further engage with those communities as we address the respective areas (to be prioritized as the work evolves) for opportunities to realize synergies including:

IEEE Programs and standards activities addressing ethical considerations:

- IC16-002 The Global Initiative on Ethics of Autonomous and Intelligent Systems
- IC18-004 Ethics Certification Program for Autonomous and Intelligent Systems (ECPAIS)
- IEEE P70xx series of standards
- IEEE Programs and standards activities addressing connectivity, inclusive access, and resilience:
- P2061 - Architecture for Low Mobility Energy Efficient Network for Affordable Broadband Access

¹ See annex 1 for descriptions of the twelve areas

- IC17-002 Digital Inclusion, Identity, Trust, and Agency (DIITA)

IEEE Programs and standards activities with aspects enabling sector-specific digital resilience:

- IC20-003 AI Systems Governance for Cities
- IC17-016 IC Industry Consortium on Learning Engineering (ICICLE)
- IC19-004 Technology and Data Harmonization for Enabling Remote Clinical Trials
- IC20-005 Global Initiative on Blockchain-based Omnidirectional Pandemic Surveillance
- IC20-006 The IEEE Applied Artificial Intelligence Systems (AIS) Risk and Impact Framework Initiative
- IC20-018 Transforming the Telehealth Paradigm Sustainable Connectivity, Accessibility, Privacy, and Security for All
- IC20-013 Rural Communication
- IC21-004 User-Centered Approach to Designing a User Interface for Rural Communities
- IC21-009 Open RAN (Radio Access Network) Initiative
- Healthcare and Life Sciences Practice, incl. standards on personal healthcare device connectivity, etc.
- IEEE P3527.1 - IEEE Draft Standard for Digital Intelligence (DQ) -- Framework for Digital Literacy, Skills and Readiness
- IEEE Humanitarian Activities Committee

3.3 Previously Published Material

Provide a list of any known previously published material intended for inclusion in the proposed deliverables of this activity.

Documentation and reports from the webinar series “Building Digital Resilience to Support COVID-19 Pandemic Response, Recovery and Rebuild,” designed and organized by the eWorldwide Group and hosted jointly by IEEE SA and the eWorldwide Group in Q2 and Q3 2020.

The IC activity has produced some papers that are available on its Wiki pages.

3.4 Potential Markets Served

Indicate the main beneficiaries of this work, and what the potential impact might be.

The main beneficiaries of this work will be strategic thought leaders, who are driving the vision for digitization, innovation, autonomous intelligence systems, robotics and space technology around the world. This will include the Technical Information, Data, Cybersecurity Offices from governments (local, regional, national levels), investment banks focusing on digital infrastructure, development agencies, academia, technology companies, industry bodies, civil society organizations advocating for digital inclusion, data privacy and human rights.

Most importantly this work will help create holistic equity and resilience for future pandemic preparedness.

3.5 How will the activity benefit the IEEE, society, or humanity?

Describe how this activity will benefit the IEEE, society, or humanity.

In tackling a very timely and globally relevant topic within IEEE’s areas of focus, it offers an opportunity to help bring IEEE’s ethics and technical standards into implementable tools and techniques that can be made accessible to the world. We expect synergies with many other IEEE initiatives (as listed in 3.2).

The main outcomes will be implementable deliverables, consisting of e.g., concrete information, frameworks, profiles roadmaps, architectures, and toolkits that, we expect, can be applied in cities or countries in both developing and developed nations. They will provide access to implementable knowledge and the ability to uplift villages’, cities’, regions’, and countries’ digital resilience across multiple aspects including holistically supporting the Sustainable Development Goals (SDGs) and economic resilience without requiring reinventing the wheel and the major investments associated with that. In addition, the entire IEEE SA will benefit from this program, as it resonates strongly with DIITA, ECPAIS, the Global Initiative, the IEEE P70xx series, Healthcare and Life Sciences Practice, Digital skills activities, and other related technical IEEE standards projects.

Ultimately, we see this as a concrete mechanism to advance technology for humanity by providing a suite of deliverables from the general frameworks to the implementable toolkits that is intended to enhance governments’ and organizations’ ability to provide services to their constituencies and customers through challenging circumstances (and by building resilience for crises, we also expect improvements for everyday).

4. Estimated Timeframe

Indicate approximately how long you expect this activity to operate to achieve its proposed results (e.g., time to completion of all deliverables).

Expected Completion Date: 03/2024

IC activities are chartered for two years at a time. Activities are eligible for extension upon request and review by ICCOM and the responsible committee of the IEEE SA Board of Governors. Should an extension be required, please notify the ICCOM Administrator prior to the two-year mark.

5. Proposed Deliverables

Outline the anticipated deliverables and output from this IC activity, such as documents (e.g., white papers, reports), proposals for standards, conferences and workshops, databases, computer code, etc., and indicate the expected timeframe for each.

Specify the deliverables for this IC activity, please be specific.

1. There will be several deliverables for this digital resilience program: White paper outlining the fundamental tenets of digital resilience (COMPLETED)
2. Digital resilience framework (COMPLETED)
3. Ecosystem mapping that captures existing activities and gaps (Target: Q3 2022)
 - A comparative analysis
 - Multidimensional gap analysis across 3-5 sectors – to be identified during the initial review and socialization process
4. A plan indicating criteria/conditions for applying specific approaches, stacks or architectures across the identified 3-5 sectors:
 - Including a listing of existing implementations and reference implementations
 - Including technical standards, guidelines, and methods
 - Including sample toolkits
5. Creation of a multi-dimensional knowledge repository (could be in the form of a spreadsheet) of existing resources, which could serve as the basis for a reference tool
6. Holistic digital resilience profiles/templates for critical areas, such as rural communities, vulnerable communities, etc.
7. Roadmaps and architectures for different use cases to support adoption and implementation in specific settings
8. Development of new standards proposals based on this work
9. It is possible that a multi-dimensional digital resilience dashboard of all IEEE standards and committee activities could result from the deliverables, time and resources permitting.

5.1 Open Source Software Development

Indicate whether this IC Activity will develop or incorporate open source software in the deliverables. All contributions of open source software for use in Industry Connections activities shall be accompanied by an approved IEEE Contributor License Agreement (CLA) appropriate for the open source license under which the Work Product will be made available. CLAs, once accepted, are irrevocable. Industry Connections Activities shall comply with the IEEE SA open source policies and procedures and use the IEEE SA open source platform for development of open source software. Information on IEEE SA Open can be found at <https://saopen.ieee.org/>.

Will the activity develop or incorporate open source software (either normatively or informatively) in the deliverables? Yes

6. Funding Requirements

Outline any contracted services or other expenses that are currently anticipated, beyond the basic support services provided to all IC activities. Indicate how those funds are expected to be obtained (e.g., through participant fees, sponsorships, government, or other grants, etc.). Activities needing substantial funding may require additional reviews and approvals beyond ICom.

This ICAID will use the basic services provided by Industry Connections staff and enhanced IEEE SA staff resources to support the executive committee and as aligned with practice priorities.

7. Management and Procedures

7.1 Activity Oversight Committee

Indicate whether an IEEE Standards Committee or Standards Development Working Group has agreed to oversee this activity and its procedures.

Has an IEEE Standards Committee or Standards Development Working Group agreed to oversee this activity? No

If yes, indicate the IEEE committee's name and its chair's contact information.

IEEE Committee Name: Committee Name

Chair's Name: Full Name

Chair's Email Address: who@where

Additional IEEE committee information, if any. Please indicate if you are including a letter of support from the IEEE Committee that will oversee this activity.

IEEE collects personal data on this form, which is made publicly available, to allow communication by materially interested parties and with Activity Oversight Committee and Activity officers who are responsible for IEEE work items.

7.2 Activity Management

If no Activity Oversight Committee has been identified in 7.1 above, indicate how this activity will manage itself on a day-to-day basis (e.g., executive committee, officers, etc.).

This IC program will create an executive committee, led by Stefan Sauermann, chair.

7.3 Procedures

Indicate what documented procedures will be used to guide the operations of this activity; either (a) modified baseline *Industry Connections Activity Policies and Procedures* ([entity](#), [individual](#)), (b) *Abridged Industry Connections Activity Policies and Procedures* ([entity](#), [individual](#)), (c) Standards Committee policies and procedures accepted by the IEEE SA Standards Board, or (d) Working Group policies and procedures accepted by the Working Group's Standards Committee. If option (a) is chosen, then ICom review and approval of the P&P is required. If option (c) or (d) is chosen, then ICom approval of the use of the P&P is required.

(a) modified baseline Industry Connections Activity Policies and Procedures

8. Participants

8.1 Stakeholder Communities

Indicate the stakeholder communities (the types of companies or other entities, or the different groups of individuals) that are expected to be interested in this IC activity and will be invited to participate.

Stakeholders include representatives from organizations that are responsible for public services, broad societal needs, and the infrastructure underlying those items, including:

- government organizations responsible for delivering services that benefit from digital infrastructure,
 - Ministries/departments overseeing critical services, e.g., health, transport, etc.
 - CTO offices of City, CIO offices of City
 - Procurement units
 - Regulators
- entities developing products and services for government services,
- network providers,
- civil society participants, especially for underserved rural communities, persons with disabilities, and other vulnerable communities,
- academic institutions,
- funding organizations.

8.2 Expected Number of Participants

Indicate the approximate number of entities (if entity-based) or individuals (if individual-based) expected to be actively involved in this activity.

Around 52 participants, and may grow based on the streams.

8.3 Initial Participants

Provide a few the entities or individuals that will be participating from the outset. It is recommended there be at least three initial participants for an entity-based activity, or five initial participants (each with a different affiliation) for an individual-based activity.

Use the following table for an individual-based activity:

Individual Name	Employer	Affiliation
Prof. Stefan Sauermann	University of Applied Sciences Technikum Wien	Same
Prof. Salma Abbasi	eWorldwide Group	Same
Sarah Pinnock	Government of United Kingdom	Same
Dr. Rajendra Kumar	Government of India	Same
Dr Padmaja Joshi	Government of India	Same
Rezwanul Jami	Government of Bangladesh	Same
Tawfique Ahmed	Government of Bangladesh	Same
Raja Segaran	Government of Malaysia	Same
Prof Andrew Jung	Seoul National University	Same
Dr. Byung-Ho Nam	Herings Global	Same
Ashirwad Tripathy	Educating Nepal	Same
Nicholas Napp	XMark Labs	Same
Prof. Aminu Ahmad	Kaduna State University	Same

Rudi Louis Hendrikus Van Dael	Asian Development Bank	Same
Samia Melhem	World Bank	Same
Amina Bello	Niger State Government	Same
Asmaa al Fadala	WISE Foundation	Same
Chairman Lee	Myongi Hospital	Same

8.4 Activity Supporter/Partner

Indicate whether an IEEE committee (including IEEE Societies and Technical Councils), other than the Oversight Committee, has agreed to participate or support this activity. Support may include, but is not limited to, financial support, marketing support and other ways to help the Activity complete its deliverables.

Has an IEEE Committee, other than the Oversight Committee, agreed to support this activity?

No

If yes, indicate the IEEE committee’s name and its chair’s contact information.

IEEE Committee Name: Committee Name

Chair’s Name: Full Name

Chair’s Email Address: who@where

Please indicate if you are including a letter of support from the IEEE Committee.

Annex 1.0: Descriptions of the 12 Areas of Digital Resilience

- i. Network and information resilience: Examining lessons for network and information resilience, redundancy and cybersecurity, as well as inclusionary measures to address and recover from a disruption in service and provide a competitive advantage across a variety of verticals. It is critical to prevent data losses, theft and manipulation, network overloads and intrusions to reduce multi-dimensional damages while allowing business continuation
- ii. Digital sovereignty, identity, privacy, data justice and trust: Examining the standards to ensure fundamental digital enablers are in place in a human-centric manner to develop trust, data agency and equity between the public, authorities, private sector and businesses to enable digitization without any apprehensions of cyber safety, security and privacy of the data
- iii. Disaster and crisis management: Examining the use of smart technologies for emergency preparedness and crisis management through integrated and interoperable technologies and mapping from radio to satellite to ensure preparedness, effective use of AI and data; for example, in contact tracing, rapid diagnostics and containment that helped in saving countless lives and flattening the COVID-19 curves
- iv. Food security, smart logistics, and traceability across the supply chain ecosystem: Examining innovative agriculture strategies, policies, information systems, platforms, blockchain applications and methods to guide governments moving forward during COVID-19 to enable resilient food supply chains across the entire eco-system from ‘the farm to the table’ to ensure traceable and sustainable food security for all communities during crisis response and recovery

- v. Healthcare and tele-medicine: Examining the role of telemedicine, health-information systems and health informatics for predictive medicine, emergency response and recovery, the infrastructure gaps and needs, and challenges and opportunities for inclusive medical support and to maintain continuous patient's management, remote diagnostics, treatment and monitoring through integrated smart wearable technologies, predictive medicine and care and wellbeing during natural disasters, pandemic or crisis
- vi. Mental wellness and addiction: Examining the foundation for mental wellness and online addiction and harm during disasters and crisis to provide guidelines and protect the physical and mental wellbeing for all, particularly children, vulnerable youth, elders and PwDs, promoting innovative hybrid caring systems, which are composed of both digital approach and analogy activities for the people who are not familiar with the digital appliances.
- vii. Education and tele-learning: Examining the needs and ways to make tele-learning and e-Education work in an equitable and successful way to meet learner and educator needs, including marginalized communities for envisioning new models of inclusive education to bridge the deep digital divides in education sector and protecting basic rights and safety of learners, especially children. In addition, ensuring a holistic upskilling and right skilling model is in place to transform the workforce for adoption and engagement in the digital world
- viii. Tele-commuting and tele-working: Examining ways to prepare for the increased network requirements during restricted times for tele-work, trade facilitation and e-Commerce to ensure reliable and secure access requirements for all types of geographical areas to maximize productivity, business continuity, trade facilitation and e-Commerce through robust platforms, cloud-based information, social interaction and welfare in the use of more widespread telework
- ix. Innovation and entrepreneurship: Examining digital infrastructure to support innovation, including entrepreneurs, techno-preneurs, SMEs and MSMEs during natural disasters, pandemic or crisis, enhancing public-private partnership to promote the entrepreneurship. Public-Private partnership would be a crucial key in the new normal era. To make the innovative ideas alive, the flexibility of government's responses would be strongly recommended. This flexibility and cooperation would support the better lives of the vulnerable groups.
- x. Digital access and inclusion: Examining the multi-dimensional accessibility requirements and infrastructure to deploy and leverage digital services, particularly for vulnerable communities with special needs and digitize the local economy according to the demands of the most vulnerable communities during natural disasters, pandemic or crisis to ensure inclusivity
- xi. Fintech, blockchain and financial inclusion: Examining innovative financing and business models, blockchain technology, trusted network and digital microfinancing to transform micro saver to micro investor to build trusted safety nets and relief packages to effectively distribute relief packages and sustenance to vulnerable communities, particularly undocumented, stateless people, refugees, internally displaced person (IDP) and people with disabilities (PwDs)
- xii. Communication and digital media: Examining the role of technology, Artificial Intelligence, autonomous system and machine learning to ensure accuracy and effective systems are in place to prevent dissemination of fake news and misinformation in order to promote good governance, cohesive societies, peace and unity to prevent negative propaganda and negative ideology and behavior

