Smart4Europe2
Catalysing Digitisation throughout Europe

Deliverable 2.4

Cross-cutting Impacts Report on Results of Impact Analysis

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[1] R=Report, DEC= Websites, patents filling, Ethics, ORDP: Open Research Data Pilot, etc., O=Other

[2] PU = Public, CO = Confidential, only for members of the consortium (including the Commission Services)

Acronyms Listed in Document	
AE	Application experiment
COVID	Coronavirus disease
CPS	Cyber-physical systems
CSA	Coordination and support action
DIH	Digital Innovation Hub
EC	European Commission
EFECS	European Forum for Electronic Components and Systems
IA	Innovation action
S4E2	Smart4Europe2
SAE	Smart Anything Everywhere
SME	Small and medium-sized enterprise
WP	Work package

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1   Executive Summary

The overall aim of Smart4Europe2 (S4E2) is to link Digital Innovation Hubs (DIHs), innovation actions (IAs), coordination and support actions (CSAs) as well as other projects aligned to the Smart Anything Everywhere (SAE) initiative and to make DIH services more widely available to small and medium-sized enterprises (SMEs) and mid-caps.

The objective of Task2.4 is to assess the potential impacts of a higher interplay of stakeholders within the SAE community (Task2.1) associated to common rules for operating lean and efficient DIH models (Task2.2) in terms of:

- Increased shared use of expertise, both looking at importing knowledge and exporting knowledge
- Increased alignment in terms of access to finance
- Increased outreach of early adopters / game changers
- Increased replication, engaging early majority behind successful early adopters

This deliverable summarizes the results and findings of Task2.4. To assess potential impacts, feedback from the SAE-IAs was collected. Thereby, all 10 IAs of the SAE-initiative which have been running or were started together with S4E2 were considered: BOWI, Diatomic, DIGIFED, DIH4CPS, FED4SAE, HUBCAB, SMART4ALL, SmartEEs, SmartEEs2, and Tetramax (cf. section 9).

According to the feedback, the impact of shared use of expertise is primarily promoted by stimulating personal contacts. Consequently, addressing the export and import of dedicated topics by jointly organized events or collaboration workshops is a beneficial approach. Among the different collaboration scenarios with cross-cutting impacts, DIHs, IAs, and CSAs can especially benefit from

(a) Harmonization of processes
  - open call management
  - digital impact measurement
(b) Organization of joint events
  - access to finance (especially events to pitch in front of investors and 1-to-1 coaching sessions on funding strategies)
  - outreach to early adopters and early majority using application experiments (AEs) as a vehicle
(c) Marketplace consolidation and collaboration
  - basic common design rules for all digital marketplaces on the short term
  - merging of all digital marketplaces on the long term

Consequently, addressing these activities will have the biggest impacts. Collaboration increases here efficiency, results in cost-savings, and creates transparency "for the costumer" i.e. SMEs and other stakeholder groups.

2 Methodology

The impact analysis is focused on the four following subject areas providing the structure to be subsequently followed:

- Increased shared use of expertise
- Increased alignment in terms of access to finance
- Increased outreach of early adopters / game changers
- Increased replication, engaging early majority behind successful early adopters

In order to assess how the combination of a consolidated community, a higher interaction level between IAs, and the sharing of efficient DIH operation practices can jointly increase impacts at both area and SAE-levels, a focus session on SAE cross-cutting impacts was offered during the SAE Collaboration Meeting on March 17th 2021. Figure 1 shows exemplary the virtual board of the interactive online session which was used to elaborate potential cross-cutting impacts together with the representatives of the SAE-IAs.
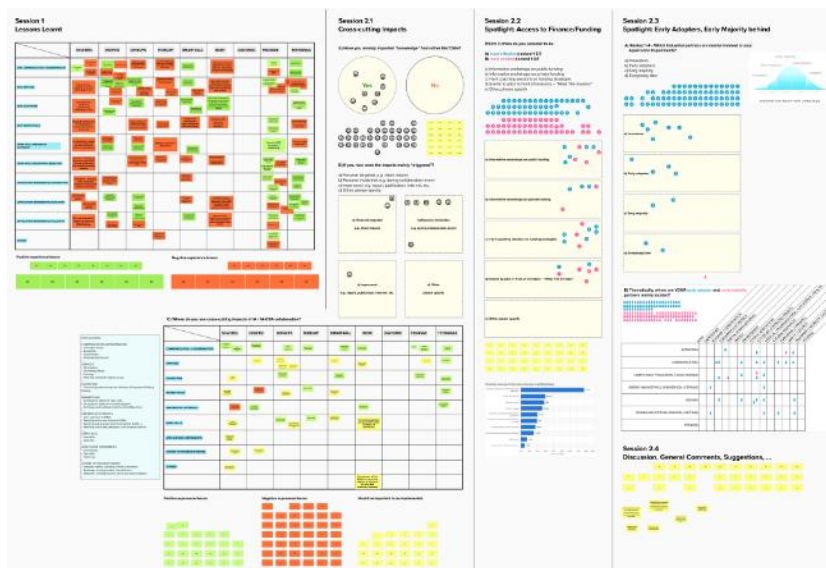

Figure 1. Snapshot of the virtual board used in the focus session on SAE cross-cutting impacts during the SAE Collaboration Meeting on March 17th 2021.

When required, selected IAs were individually contacted after the collaboration meeting for further input or to clarify issues. The "raw" input from the SAE-IAs was then structured, categorized, and condensed. In addition, information gathered in Task2.1 by questionnaires and workshops was supplementally used and interpreted, if appropriate.

3 Increased Shared Use of Expertise

3.1 Shared use expertise

To evaluate the present state of shared use of expertise among the SAE-IAs, the situation with respect to the import of knowledge was first considered. Thereby, nearly all SAE-IAs (9 out of 10) have already imported knowledge from other IAs and/or CSAs demonstrating a clear willingness to share expertise. As shown in Figure 2, the imports were predominantly triggered by personal incidental contacts made during events rather than by targeted inquiries or the study of available documented information.
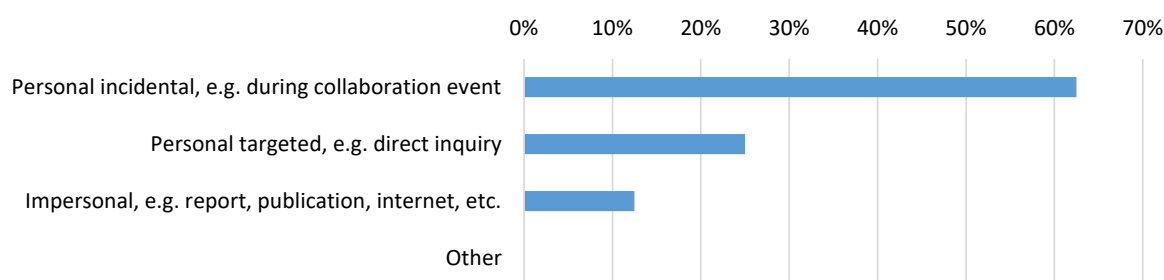

Figure 2. "Triggers" for import of knowledge from other IAs and/or CSAs.

Obviously, the personal random factor plays an important role to share expertise and has the biggest impact, whereas documented information is less relevant. Consequently, this supports the value of collaboration events as an instrument to stimulate the knowledge transfer and exchange among the IAs and should be further expanded.

3.2 Cross-cutting impacts of IA/IA-CSA collaboration

From the point of view of the SAE-IAs, (potential) impacts of current and future cross-cutting collaborations in the following nine collaboration areas are listed in Table 1:

- Communication & Dissemination
- Services
- Ecosystem
- Marketplace
- SME/midcap outreach
- Open calls
- Application experiments
- Access to finance/funding
- Others

The feedback from the SAE-IAs is weighted according to the number of mentions and clustered according to positive and negative experiences/lessons as well as aspects which are important to be implemented.

Table 1. Weighted feedback on cross-cutting impacts of IA / IA-CSA collaboration.

COMMUNICATION & DISSEMINATION	SERVICES	ECOSYSTEM	MARKETPLACE	SME/MIDCAP OUTREACH	OPEN CALLS	APPLICATION EXPERIMENTS	ACCESS TO FINANCE/FUNDING	OTHERS
Events (incl. joint participation in each other's events)								
Newsletters								
Social Media		**Ecosystem connection** (open calls & project exploitation)		**Joint promotion** (calls, collaboration with local/regional associations and funding programmes)	**Joint dissemination & outreach** (to increase impact)			
Web visitors from the SAE website	**Marketplace**	**Brokerage activities** (via the national competence centers and their eco-systems)	**Open call details**	**Twin projects** (midcap + SME / tech + non-tech)				
Sharing news with CSA		**Interconnecting South Eastern Europe stakeholders**						
			No SAE-marketplace mature enough for SME matchmaking	**Not much visibility on which IA succeeded in engaging midcap and non-tech**				
	Marketplace							
	Digital impact measurement				**Harmonising application process** (call descriptions, communication, templates)			
	Digital maturity definition	**Single database**	**Single marketplace from EC side**	**Cross advertising of activities targeted to SMEs/Midcaps**	**Common pool of proposal reviewers**	**Check if any third parties benefited from different IAs / technologies**	**Feedback on how successfull other IAs were in accessing additional funding**	**Link with EDIHs** (exploitation of assets from DIHs)
	Technology radar		**Collaboration of marketplaces after projects**	**Cross-collaboration between DIHs** (to support areas missing)		**Application experiments across projects**	**Sharing opportunities through a central marketplace**	
			Automated sharing of resources and assets				**Events for access to private finance and funding / connection with investors**	

Number of mentions

Positive experience/lesson	1	2	3	4	5	6
Negative experience/lesson	1					
Would be important to be implemented	1	2	3	4		

Before going deeper into Table 1, a general sum-up of positive and negative experiences with collaboration in the nine areas is provided in Figure 3.
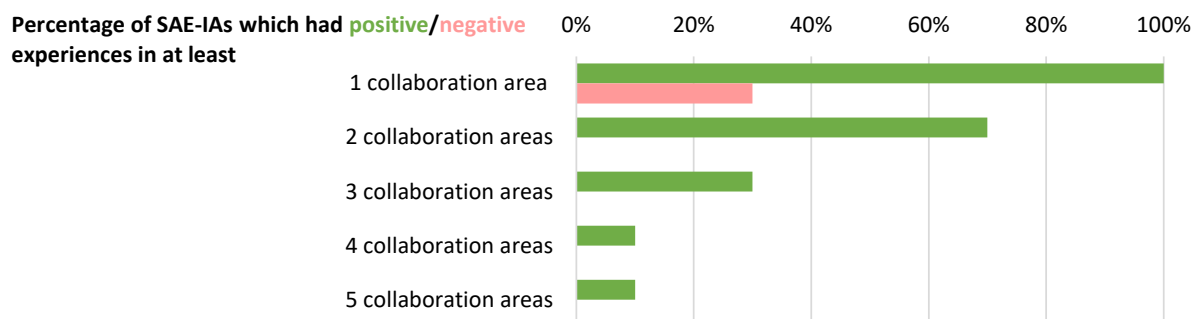
Percentage of SAE-IAs which had positive/negative experiences in at least

Figure 3. Percentage of SAE-IAs which had positive/negative experiences with IA/IA-CSA collaboration in different numbers of collaboration areas.

Each SAE-IA has already had positive experiences with collaboration in at least one area, 70% in two or more areas. In contrast, negative experiences are only mentioned by 30% and limit to not more than one area. Hence, IA/IA-CSA collaboration is generally considered to have a positive effect.

Positive experiences/lessons – what works already very well
Positive experiences are mentioned for all areas except APPLICATION EXPERIMENTS and ACCESS TO FINANCE/FUNDING. This is not unexpected, since dedicated mechanisms for joint experiments between IAs, CSAs, and DIHs as well as the associated funding schemes do not exist yet. The most positive experiences are related to joint promotion and dissemination activities in the broader sense. Thereby, collaborations in the areas of events and newsletters are most often mentioned and can be considered as the areas where IA/IA-CSA collaboration works already best.

Negative experiences/lessons – what doesn't work that well
Among the different comments, there are only two negative remarks in the areas of MARKETPLACE and SME/MIDCAP OUTREACH. However, these remarks include primarily comments which can be also moved to the "would be important to be implemented" section rather than considering them as "real" negative experiences. In this respect, the lack of maturity and common SAE design rules of marketplaces is something that needs implementation and could go along with the consolidation/harmonisation subsequently discussed.

What would be important to be implemented – potential for cross-cutting impacts
Individual aspects which are important to be implemented are mentioned for all areas except for COMMUNICATION & DISSEMINATION keeping in mind that the most positive experiences are located there. Thereby, the aspects mentioned by multiple SAE-IAs are of particular interest because, if addressed, they will be accompanied by increased acceptance and thus the impact will be magnified. In addition to the three focus areas "access to finance", "early adopters", and "early majority" covered later in sections 4-6, the following three collaboration areas were suggested by at least two SAE-IAs:

(1) Marketplace collaboration

The collaboration on marketplaces is most often suggested. Furthermore, related aspects such as consolidation to a single EC-marketplace, continuation of the marketplace activities beyond the runtime of individual projects, and extension of marketplaces towards financial aspects are mentioned.

(2) Digital impact measurement

Collaboration on digital impact measurement (as a service) would be also appreciated, necessarily requiring a joint digital maturity definition.

(3) Harmonisation of the application process for open calls

The harmonisation of the application process for open calls is suggested. Aspects to be addressed include call descriptions, communication and templates and could be further extended to a common pool of proposal reviewers.

4 Increased Alignment in Terms of Access to Finance

To evaluate cross-cutting impacts by increased alignment in terms of access to finance, the SAE-IAs were asked to rank the top 3 most effective as well as most needed offers. The results are shown in Figure 4 and Figure 5, respectively.
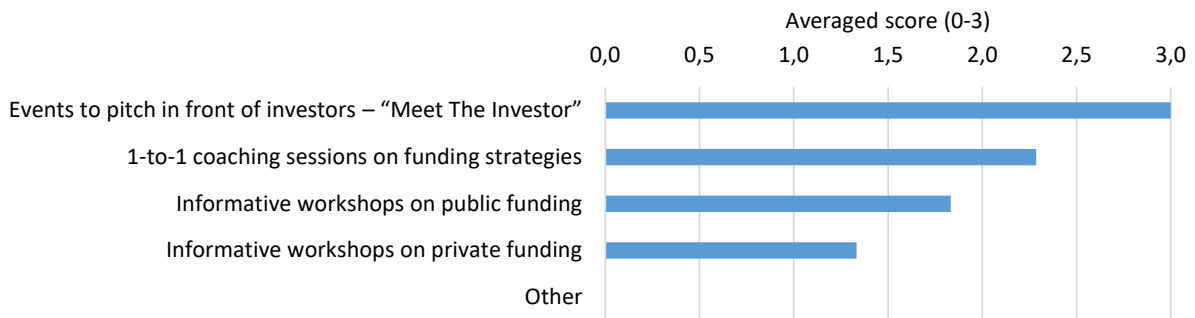

Figure 4. Ranking of most effective offers with respect to access to finance/funding.
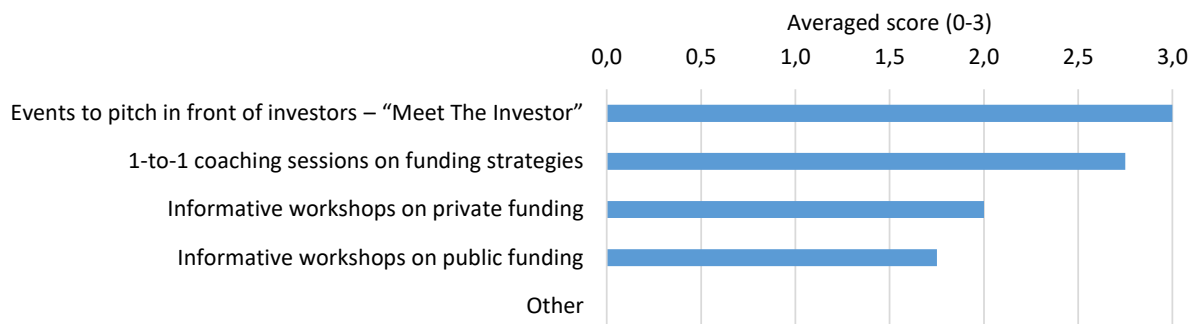
Figure 5. Ranking of most needed offers with respect to access to finance/funding.

In both cases, events to pitch in front of investors and 1-to-1 coaching sessions on funding strategies are seen as the most effective as well as most needed offers. This is interesting as it clearly shows that people are interested in next stage funding beyond research and they also want help in getting this funding. Consequently, joint events of these categories should be strengthened.

5 Increased Outreach of Early Adopters / Game Changers

Industrial stakeholders are directly involved in the SAE-IAs by participating in the application experiments. Therefore, the participation of the different industrial stakeholder groups in the application experiments (AEs) was first evaluated. This was done according to the "Innovation Adoption Lifecycle" represented by Everett Rogers' bell curve shown in Figure 6.
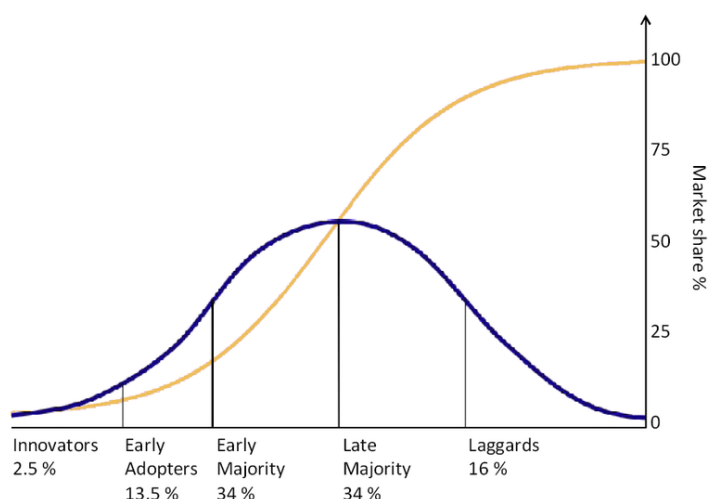

Figure 6. The diffusion of innovations according to Rogers' bell curve for the "Innovation Adoption Lifecycle". (Source: Wikipedia)

In the innovation lifecycle, the first group of "Innovators" which use a product or a technology is followed by the "Early Adopters". In turn, these are followed by the "Early Majority" taking up the innovation and significantly increasing the market share.

According to the ranking from the SAE-IAs, innovators and early adopters are considered to be mainly involved in the AEs as shown in Figure 7. This is not surprising as both groups are the target groups to be supported by the IAs. The early majority and subsequent costumer groups are also represented in the AEs, but to a much lower degree. Therefore, the participants in the AEs should not only be considered as thematic participants, but also as costumer groups which can serve as multipliers. Consequently, the SAE-IAs can access the group of early adopters by the AEs and should use this vehicle. In this respect, the impact can be further multiplied by taking up suggestions from Table 1:

- Implementing AEs across SAE-IAs/DIHs
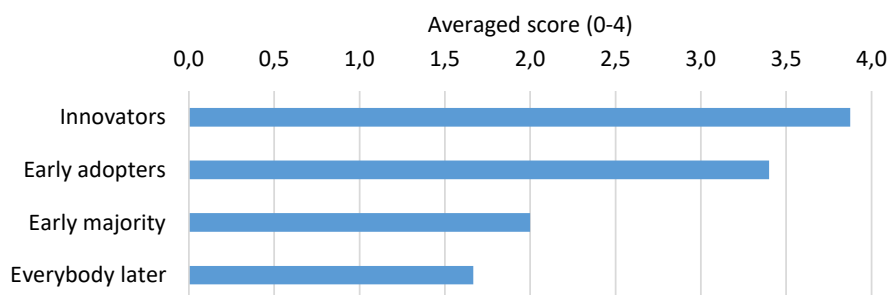- Identification of further third parties which also benefited from AEs

Figure 7. Ranking from the SAE-IAs: Industrial partners mainly involved in the application experiments.

6 Increased Replication, Engaging Early Majority Behind Successful Early Adopters

The thematic distribution of the AEs as evaluated in Task2.1 is shown in Table 2(a). Based on a self-assessment of the SAE-IAs, the main thematic location of the early adopters as well as the early majority in the AEs are shown in Table 2(b) and (c), respectively. Compared to the distribution of the AEs, the thematic distribution narrows to about 40% for early adopters and to about 20% for the early majority. This is expected and corresponds to the diffusion of innovations, keeping in mind that innovators are mainly present in the AEs. In all cases except one the early majority follows areas where the early adopters are already active. Consequently, the AEs can also be used as a vehicle to engage the early majority behind the early adopters.

Given the distribution of early adopters and early majority, areas which should be next conquered according to the innovation adoption lifecycle can be extrapolated and are highlighted in green.

Table 2. Thematic distribution of (a) applications experiments and main thematic location of (b) early adopters as well as (c) early majority in the application experiments over all SAE-IAs.

(a) Thematic distribution of the application experiments of all SAE-IAs

	(AEROSPACE)	BUILDING / CONSTRUCTION	CONSUMER ELECTRONICS	DIGITAL MANUFACTURING	ENERGY	ENVIRONMENT	FOOD & AGRICULTURE	IOT/SMART CONNECTED OBJECTS	MEDICAL / PHARMACEUTICAL / LIFE SCIENCE / HEALTH	NATURAL RESOURCES	PACKAGING / LOGISTICS	SAFETY / SECURITY	TRANSPORT / MOBILITY / AUTOMOTIVE	OTHER(S)
ACTUATING		■					■	■	■	■	■	■	■	
COMMUNICATING	■	■	■				■	■	■	■	■	■	■	■
COMPUTING / PROCESSING / DATA STORAGE	■	■	■											
ENERGY HARVESTING / CONVERSION / STORAGE	■						■							
SENSING	■													
SIGNALLING (OPTICAL IMAGING, LIGHTING)	■													
OTHER(S)	■										■	■	■	

(b) Main thematic location of early adopters in application experiments

	(AEROSPACE)	BUILDING / CONSTRUCTION	CONSUMER ELECTRONICS	DIGITAL MANUFACTURING	ENERGY	ENVIRONMENT	FOOD & AGRICULTURE	IOT/SMART CONNECTED OBJECTS	MEDICAL / PHARMACEUTICAL / LIFE SCIENCE / HEALTH	NATURAL RESOURCES	PACKAGING / LOGISTICS	SAFETY / SECURITY	TRANSPORT / MOBILITY / AUTOMOTIVE	OTHER(S)
ACTUATING								■						
COMMUNICATING		■						■			■			
COMPUTING / PROCESSING / DATA STORAGE	■							■						
ENERGY HARVESTING / CONVERSION / STORAGE	■													
SENSING		■												
SIGNALLING (OPTICAL IMAGING, LIGHTING)			■									■		
OTHER(S)			■											

(c) Main thematic location of early majority in application experiments and future expected areas

	(AEROSPACE)	BUILDING / CONSTRUCTION	CONSUMER ELECTRONICS	DIGITAL MANUFACTURING	ENERGY	ENVIRONMENT	FOOD & AGRICULTURE	IOT/SMART CONNECTED OBJECTS	MEDICAL / PHARMACEUTICAL / LIFE SCIENCE / HEALTH	NATURAL RESOURCES	PACKAGING / LOGISTICS	SAFETY / SECURITY	TRANSPORT / MOBILITY / AUTOMOTIVE	OTHER(S)
ACTUATING			■			■		■	■			■	▧	
COMMUNICATING		▧	■	▧			▧		▧	▧	▧		
COMPUTING / PROCESSING / DATA STORAGE		▧			▧		■						
ENERGY HARVESTING / CONVERSION / STORAGE	▧						▧						
SENSING		▧	■		▧	■					▧		
SIGNALLING (OPTICAL IMAGING, LIGHTING)	▧		■							▧		
OTHER(S)			■										

Legend:
■ Main thematic location
▧ Future expected areas

7 Potential Impacts and Recommendations

Among the different collaboration scenarios, DIHs, IAs, and CSAs can especially benefit from (a) the harmonization of processes, (b) the organization of joint events, and (c) the marketplace. Consequently, addressing these activities will have the biggest impact. In this context, the three collaboration directions relate to the following areas:

(a) Harmonization of processes
- open call management
- digital impact measurement
(b) Organization of joint events
- access to finance (especially events to pitch in front of investors and 1-to-1 coaching sessions on funding strategies)
- outreach to early adopters and early majority using AEs as a vehicle
(c) Marketplace consolidation and collaboration
- basic common design rules for all digital marketplaces on the short term
- merging of all digital marketplaces on the long term

Collaboration increases here efficiency, results in cost-savings, and creates transparency "for the costumer" i.e. SMEs and other stakeholder groups. Especially the IAs and CSAs have realized that it is better to have one joint event, one common marketplace, etc. instead of offering a confusing variety. This is also due to the current situation, as the COVID-pandemic has generally increased the number of low-threshold online offerings and thus also intensified the competitive situation. In addition, by collaboration a larger customer base can be addressed. This is particularly the case because the SAE-IAs were set up in a complementary manner.

For instance, the joint (virtual) appearance of the SAE-IAs at events such as the European Forum for Electronic Components and Systems (EFECS 2020) or the EDIH event 2021 under the umbrella of the SAE-initiative proves the feasibility and advantage of such joint approaches (Figure 8).
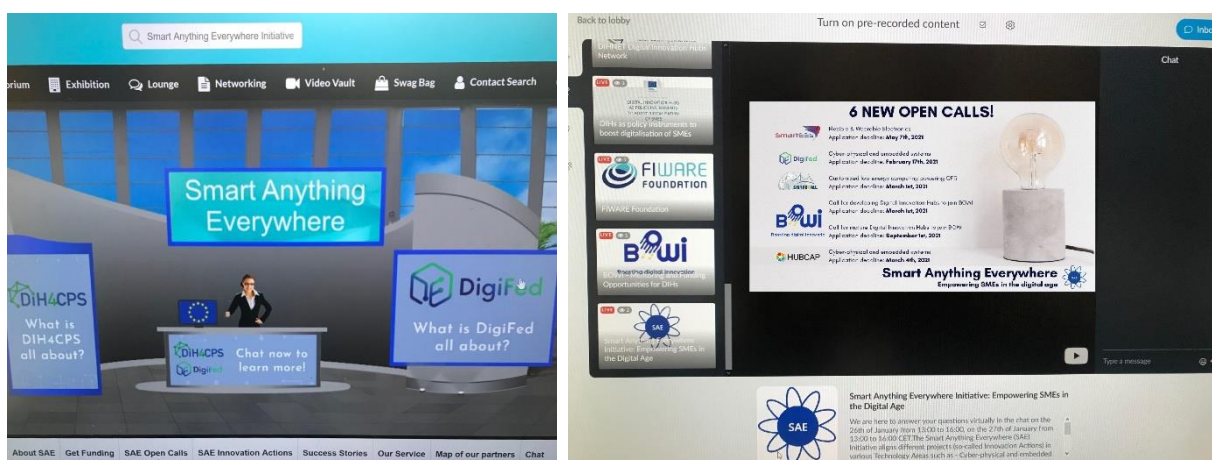

Figure 8. SAE-IAs under the umbrella of the SAE-initiative at the (virtual) EFECS 2020 (left) and the EDIH Event 2021 (right).

8 Concluding Remarks

Based on feedback from the SAE-IAs, potential impacts of a higher interplay of stakeholders within the SAE community were assessed. According to the feedback, the impact of shared use of expertise is primarily promoted by stimulating personal contacts. Consequently, addressing the export and import of dedicated topics by jointly organized events or collaboration workshops is a beneficial approach. In general, the considered activities can be implemented by DIHs, IAs, and CSAs.

(1) General IA/IA-CSA collaboration
In distinct areas such as the joint promotion and dissemination of activities (in the broader sense) IA/IA-CSA collaboration has already cross-cutting impact and works very well. Further collaboration areas with potential cross-cutting impact were identified by the SAE-IAs as:
- Marketplace collaboration and extension
- Collaboration on digital impact measurement
- Harmonisation of the application process for open calls

(2) Increased alignment in terms of access to finance
With respect to access to finance, collaboration in the following two areas is considered to be most effective as well as most needed:
- Events to pitch in front of investors
- 1-to-1 coaching sessions on funding strategies

(3) Increased outreach of early adopters / game changers
The SAE-IAs have access to a large pool of early adopters by the AEs and should use this vehicle keeping in mind that the SAE-IAs represent a total of around 500 AEs.

(4) Increased replication, engaging early majority behind successful early adopters
Although the early majority is inevitably less represented in the AEs, this group can also be accessed by the AEs.

Consequently, activities related to these areas should be strengthened and will have the biggest impact.

9 Appendix – SAE-IAs

Name and link to the website of all SAE-IAs which have been running or were started together with S4E2 and which were considered in Task2.4 (in alphabetical order):

BOWI	https://bowi-network.eu
Diatomic	https://diatomic.eu
DIGIFED	https://digifed.org
DIH4CPS	https://dih4cps.eu
FED4SAE	https://www.fed4sae.eu
HUBCAB	https://www.hubcap.eu
SMART4ALL	https://smart4all-project.eu
SmartEEs	https://smartees.eu/smartees-project
SmartEEs2	https://smartees.eu
Tetramax	https://www.tetramax.eu