



Enabling Growth through Innovation by Collaboration

The impact plan for ITEA 4 *the future*

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Foreword

ITEA - created by and for industry

Dear Industry representatives, Dear Public Authorities,

An impactful achievement is only realised by a Community if all stakeholders aim their arrows in the same direction.

ITEA's goal is to create impact through innovation via collaboration,
and this aim is agreed by all of its stakeholders.

Digitalisation changes our lives radically; every object carries more and more software in its structure. Each and every organisation has an emerging need for software innovation to be more efficient, more effective and more resilient. Furthermore, the daily life of every human is more connected and digitalised, the resources of our planet are scarce and so must be used with great care. These are challenges that we face, and they can only be overcome by continuous and sustainable improvement of each process through collaboration among diverse industrial members.

ITEA 4, as a Eureka R&D&I programme, will stimulate and boost innovative changes and partnerships that will further strengthen our international ecosystem and lead to massive impact and a leading position in software innovation and digital transition. All this is driven by our industrial Community; bottom-up and customer oriented.

Therefore, ITEA is created by and for industry with the support of Public Authorities.

This Impact plan for ITEA 4 the future was developed as a route towards ITEA 4. The purpose of this publication is to share:

- the rational properties of ITEA with over 20 years of experience
- the ITEA vision of creating impact in business and society through research on software innovation
- the mission to create sustainable growth for the economies of companies and countries
- the scope that defines the highlighted topics and presents ITEA's openness as a bottom-up model
- the quality assurance with its ambitious KPIs to create growth in industries
- the bridge that connects the successful years of ITEA and its promising future

In addition to this Impact plan, a Strategic Vision and Technology Roadmap have been prepared to present the technical challenges that ITEA 4 aims to solve.

We are very grateful to our dedicated and committed ITEA Community and Public Authorities for their continued and motivating support and valuable contribution to ITEA 4 the future.

ITEA Presidium
February 2021

1 ITEA Rationale and vision

Over the past few years, the importance of software has been increasing tremendously as:

- The world demands more and more complex functionalities that are delivered through software; there is a need for more efficient, complex systems and agile engineering.
- The demand for agility and personalisation of products can only be efficiently delivered through software; there is a need for more intelligent systems, based on big data, data science, artificial intelligence, ontologies, machine learning, and knowledge-based tools and methods.
- The key trend of the service business model is accelerating a shift by companies towards software, even the more traditional ones.
- The 'digital' part of the economy continues to grow and software is the main enabler of this expansion.

For example, in the field of Manufacturing, according to the 'Additive Manufacturing Landscape 2019' report by AMFG for 171 companies and institutions, one key trend identified is that software is becoming critical for the next phase of industrialisation given the capability of software innovation to adequately cope with the specific requirements of the additive manufacturing process.

The multi-country and multi-industry EY report 'Tech Horizon: Leadership perspectives on technology and transformation' (March 2020) also shows that companies that excel at digital transformation share six practices. Digital transformation leaders that exhibit these six practices enjoy better financial performance than companies that have yet to adopt them. To catch

up, the rest of the pack should learn from the digital transformation leaders who:

- Focus on customers first and foremost.
- Accelerate AI to drive growth.
- Drive innovation through ecosystems and partnerships.
- Nurture talent with new incentives and strategies.
- Activate governance plans for emerging tech.
- Power innovation by leveraging data and being agile.

The danger is to let America and China dominate the mastery of new software development; it is crucial for Europe to be back in the 'Premier League' of the game. As Roland Berger states in 'Computers On Wheels: Turning OEMs Into Software-Enabled Companies' (June 2020), "In the digitalization of the automobile, it's software that plays the central role. Whereas the large technology groups may well have a perfect mastery of new software development and how to deal with it, many companies in the automotive industry are still very much in learning mode. Sadly, though, there's little time for that, given the fact that numerous rival firms – especially the new automakers from the US and Asia – are years ahead of incumbent OEMs and have already brought software-driven models to market. If auto manufacturers want to emerge successful from the digitalization of the automobile, they need to transform their production processes and the way they work with suppliers – and they need to do it fast".

Globalisation is often felt as a threat for the local industries, but it should be reconsidered as a unique opportunity as markets are becoming less and less protected, and continuous (open) innovation is leading to their disappearance. For example, the current COVID-19 crisis clearly shows the need to be able to react very quickly at a worldwide level. It is important to invest in open partnerships gathering large companies, SMEs,



universities and research institutes from Europe and beyond, to collaborate all together.

To facilitate this collaboration, the industrial Community, including large companies and SMEs, is both willing and has to keep the international, bottom-up tool ITEA provides in order to set up fruitful partnerships delivering results for the market. Large industrials are increasingly demanding partnerships with innovative SMEs, while innovative SMEs need a boost to access the global market. Together they can tackle the current challenges in software innovation.

At present, there is also a massive trend towards **full digital loop** design whereby operational user data is converted real-time and continuously from industry into information, thereby gaining better control over the production process, the use of the product and the future design. **Modelling, simulation and reliable digital twins** are needed to enable this full digital loop supported by reliable infrastructure.

Additionally, there is a need for **smarter systems based on big data, data science, artificial intelligence, ontologies, machine learning and knowledge base**, and a massive movement towards **complex multitenant platforms** e.g. for patient monitoring, Mobility-as-a-Service, electric and autonomous cars, smart cities, social network management, AI for security and security for AI, privacy, trusted industrial subcontractor chain management and collaborative efficient agile engineering.

Data is considered to be the new gold; the ownership of data will be a strong determinant for the power in tomorrow's world (Yuval Noah Harari speaks of data colonialism in "Homo Deus - A Brief History of Tomorrow"). It means being able to collect, own, use, interpret and process data. Supported and enhanced by software tools and systems, many major challenges (as defined by ITEA) can be dealt with, e.g. keeping our cities liveable, mastering the enormous increase of healthcare demand, balancing green power generation with demand and many more.

It is recognised that ITEA is a very successful R&D&I programme and ITEA projects have a proven track record of being innovative, providing unique solutions to the current trends and having potential to impact society and the market. These successes have been possible through different assets that have been built and validated within ITEA year after year:

- **Dynamic ecosystem**
The ITEA Community has shown its capacity for creativity and level of openness towards international collaboration. This includes a unique spirit of trust between large companies and innovative SMEs, which represent 50% of our manpower, to generate worldwide impact that would otherwise be inaccessible for SMEs. In addition, there are 30-50% newcomers in ITEA projects and around 20% of the projects are led by new companies, clearly showing the openness of the ITEA Community.

- **Agile methodology**

After more than twenty years of progress, the ITEA recipe for success is based on:

- A clear definition of customers'/users' challenges and a clear definition of the targeted customers and users.
- A strong and continuous analysis of the State-of-the-Art (SotA) to position ITEA's innovation beyond the SotA.
- A focus on the importance of market and technology value chain.
- Advanced game-changing ideas and a system architecture view to move towards an actual offer.
- Innovation is mandatory, evolutionary and revolutionary.
- Flexibility towards cooperation on new topics with Eureka Clusters of the Eureka Clusters Programme (ECP). Besides the bottom-up single Cluster Calls, the ECP will also consist of so-called thematic Joint Calls. These Calls may be relevant for one or more Eureka Clusters. ITEA is fit for purpose to cooperate with other Clusters in these Joint Calls and to collaborate in the organisation of related events.
- A low level of bureaucracy and strong support from the ITEA Office.

- **Toolset to support the methodology**

- *International customer workshops*, taking place once per year to gather the needs of international key customers of the chosen theme to start R&D&I from challenges coming from the market. A different theme is chosen each year to provide (promotion) opportunities to the diverse Community partners

and strengthen the variety in projects. Emerging societal challenges are taken into consideration when selecting a theme.

- *Coaching project reviews*, taking place once per year, following the ITEA methodology from an outsider view and thus very openminded. ITEA's goal is to systematically look for paths and advice to support the project team to enhance the project, which openly shares encountered difficulties. This openness is the root for progress and for the unique level of success observed in ITEA.
- *Project progress reports and evaluation*, taking place every 6 months, to follow the progress of the projects, employing a similar coaching approach.
- *Participation in customer-oriented, thematic events* to exhibit ITEA projects and their outcomes, fitting the event's theme. The target is to steer the innovations and push them in the market through direct contact with the customers and to create more awareness of the ITEA programme.
- **Effective and Efficient Office**
 - *ITEA has held an ISO 9001 certificate of quality by DEKRA since 2014*, which is the result of mastering its processes and is unique for an R&D&I programme.
 - *Very efficient management by the ITEA Office* to reduce the administrative and financial burden on the projects and to be predictable in a very precise way.
 - *A rich and stable information system* which connects the full ITEA Community, the customers and the ITEA Office and enables efficient project creation and management.



ITEA has already demonstrated its importance and is convinced of the value of the upcoming ITEA programme to master the new massive trends in the market of the future. The ITEA Community members testify:

“ITEA provides a unique trusted Community in which it is easy for small and for big companies to find partners and to set up successful R&D&I cooperations; ITEA is consistently focusing on ground-breaking innovations with maximum impact for economy and society. Moreover, in ITEA, project evaluation, monitoring and coaching is done by experienced industry experts and it provides a unique flexibility for industry to stay tuned with market developments. ITEA helps us to develop our international collaborative management capabilities.”

- Philips (The Netherlands)

“Thanks to participation in the ITEA SAFE project, Continental established the ISO 26262 compliance in two major domains, namely the safety critical domains of powertrains and chassis brake systems. These domains represent 40% of Continental’s product share and thanks to the SAFE project, Continental was able to keep its leading role in these domains.”

- Continental (Germany)

“Thanks to ITEA, Siemens has a faster and steeper learning curve in new topics. It provides good means for collaboration within a consortium of experts, customers and suppliers covering the full value chain. Finally, ITEA adds to the visibility and the creation of an innovative image in R&D Community.”

- Siemens (Germany)

“The performance improvements achieved for RECOM’s 3D combustion simulation software developed in the ITEA H4H project have enabled RECOM to make the necessary transition from traditional contracts in the coal-based power generation sector towards other industrial sectors within less than two years, allowing the company to recover more than 50% of lost turnover and stay in business.”

- RECOM (Germany)

“Participation in the ITEA project SCALARE has enabled Husqvarna to make the digital transition, with its team of 4-5 software developers expanding to more than 200 people and enabling a 50% shorter time-to-market compared to 2016.”

- Husqvarna (Sweden)

“For Mondragon University, company’s requests for projects have increased yearly, thanks to participation in the ITEA project ACCELERATE. Often those projects are adopted by the company as solutions to their needs and about 15-20% of the students end up working there.”

- Mondragon University (Span)

“Through participation in the ITEA project MEDIATE, the SME FEops gained CE approval for its TAVIguide product and secured an investment injection of €6m for the FEops HEARTguideTM. FEops has grown from 4 to 15 employees.”

- FEops (Belgium)

“After the MoSHCA project, SME Evalan has experienced a growth rate of 100% each year, in 2016, 2017 and 2018. This growth is reflected in all metrics – employees, turn-over, profitability etc. During that period Evalan has added 40 FTEs to its payroll.”

- Evalan (Netherlands)

2 One goal - Enabling Growth through Innovation by Collaboration

Building a strong ecosystem that will enlighten the future is only possible by standing on the results of the past, the needs of the present and dreams of the future.

This ecosystem will serve a common purpose of the Community to ensure it is owned, protected and strengthened by its Community naturally and continuously during its life cycle.

In ITEA, 'Collaboration' is the main concept in all actions to create societal or economic impact that benefits all stakeholders from Industry and Public Authorities. 'Enabling growth' is the strategic and common goal of these stakeholders. 'Innovation' is the solution for this strategic goal.

The ITEA Community is built by large industry, SMEs, universities and research institutes and has a strong connection with Public Authorities:

- To understand what has been successfully achieved nationally.
- To learn what the national societal challenges are.
- To identify what the strategic plans are, on a national level.

While co-building an innovative solution in each project, the ITEA Community accesses the powerful attributes of each Community member:

- SMEs bring out-of-box thinking, agility and flexibility.
- Industry leaders / large industry companies enable big thinking, global impact and worldwide market access.
- Research institutes and academia open doors to a deep knowledge base to be a step beyond the State-of-the-Art.

Together they create the trusted openness of the ITEA Community and innovative solutions for real customers of industry. And, as crossovers, they can lead to new and unexpected innovations. ITEA is open for collaboration with the other Eureka Clusters to explore new innovation topics.

Various industry representatives from automotive, healthcare, safety and security, energy and software development collaborate with each other. The unique feature of ITEA is its ability to look outside, towards market potential:

- To understand others' success cases that may be applied in their industry as a butterfly effect:
 - In AVANTI, an SME moved its knowledge base from the automotive to the space industry.

- To share needs with others to create a new solution by bringing in a vertical knowledge base:
 - In MODELISAR, Dassault introduced simulation knowledge to Daimler and built the FMI global standard.
- To identify a common futuristic product or solution that may create a disruptive impact for their industry:
 - In SoRTS, Philips and Elekta created a brand-new concept of medical instruments and treatment.

ITEA consists of an agile and a flexible Community that creates global impact by developing products, services and processes that are beyond the State-of-the-Art. ITEA is

prepared to further improve for its next programme by:

- *Committing to be a toolbox for Public Authorities and industry:* ITEA has a flexible structure enabling a new Call type or a new event to be designed to take an action for urgent needs.
- *Designing extra thematic Calls based on the national priorities defined by Public Authorities:* Whenever more than two countries define a common challenge that addresses a need for innovation in a software solution, ITEA may initiate a thematic Call.
- *Adapting and strengthening its collaboration with other Clusters and Eureka instruments.*

**For ITEA 4, there is one purpose agreed by all stakeholders,
to create impact to enable Sustainable Growth
through Innovation, which is only possible by Collaboration.**



3 ITEA 4 Scope

ITEA stimulates industry-driven, innovative and pre-competitive R&D&I projects that will contribute to the digital transformation, improve the position of software innovation in Europe and beyond and the competitiveness of the software-intensive industry and service sectors and enhance society's sustainability.

ITEA 3 has shown strong impact in many industries that are crucial for the economic and competitive position of its Community. Besides economic impact via employment growth, revenue growth and new investments, ITEA projects have delivered societal solutions and impact for the following key challenges:

- Smart cities
- Smart energy
- Smart communities
- Smart health
- Smart mobility
- Smart industry
- Smart engineering
- Safety and Security

These areas are closely related and contribute to the two main challenges, Sustainability/Green Economy and Digital Transition, that Europe has defined for the coming decade. The Digital Transition will contribute to many aspects of sustainability in society: not only renewable energy and power distribution, but also sustainable means of mobility, durable future concepts for health and more.

4 Ambition, Mission, Targets and Expected Impact

4.1 Mission

ITEA's mission is to spawn innovative, funded projects of high quality, that, catalysed by the ITEA label and coaching, deliver game-changing solutions through software innovation and ensure fast as well as long-term exploitation of results. ITEA wants to cover software innovation for the full stack, from user experience to embedded software and to innovate itself continuously to help the ITEA Community deliver new products, services and technologies in an efficient way.

4.2 Ambitions

The ambition for ITEA projects is to:

- Provide concrete global solutions with tangible results to tackle the urgent challenges and trends of society defined by international consortia to the benefit of all stakeholders.
- Accelerate sustainable growth of industry through innovative products, platforms and standards.
- Push for new and upcoming trends in software innovation including AI, Big Data, Machine Learning, etc.
- Create crossover innovations through ITEA's open innovation Community and by cooperating with other Clusters.

The ambition for the ITEA programme management is to steer R&D&I to achieve optimal impact starting from the concrete needs of customers, end users and society and to support the sustainable growth of European enterprises. Therefore, it is ITEA 4's ambition to enlarge its Community with stakeholders from the market to support this mission. They can be a determinant for the added value of project results and the follow-up of project results.

ITEA 4 will build a global customer advisory board, for specific challenges and demand of a group of stakeholders, for customer validation and market introduction. It is in the customer's interest to become aware of innovation trends and to identify the right partners that can solve their challenges. It is in ITEA's interest to achieve impactful projects with fast exploitation. This will also be stimulated by mobilising partners to cooperate in exploiting the results of the projects, and by preparing to disseminate the results and explore market introduction.

Finally, ITEA 4 will strive to have a strong role in the Eureka Clusters Programme (ECP) that will take off in July 2021. First of all, this means that ITEA 4 will remain an exemplary Community that fosters and strengthens the bottom-up approach by maintaining the so-called single Clusters Calls, but also by facilitating and giving a bottom-up colour to the Joint Calls. The Joint Calls will lead to new combinations between Clusters, and can also act as a springboard for newcomers to participate in single Cluster Calls.

ITEA 4 will also put efforts into:

- Actively approaching new countries involved in the Joint Calls to become part of the ITEA Community.
- Stimulating countries to allocate extra country budgets for the Joint Calls to support the thematic Calls on top of the single industry-driven Cluster Calls.
- Implementing evaluation methods and schemes that result in a balance between high-quality proposals and a short time to contract; the organisation of Joint Calls is expected to increase this alignment and streamlining.

Some similarities exist between ITEA 4 and the new European Partnership for Key Digital Technologies (KDT) Programme, particularly in some of the technology areas and some participating players. Still, ITEA 4 will clearly be complementary to this, and other Horizon programmes. ITEA 4 will not develop a SRIA that is leading for the choice of content within Calls and supported projects.

4.3. Mid-term targets (4 years) and expected impact

Start date	1-7-2021
Number of projects	70
Number of partners involved	700
Number of SME partners involved	350
Stakeholder satisfaction of project Community	4 out of 5 (3 = good)
Exploitation results (new products/services/ systems)	500
Dissemination activities (publications/conferences)	1000
Standardisation actions	90
Total effort	8,000 person-years
Total budget	€ 960 M
Growth of micro innovative enterprise	# from pp<10 to double, target is 20
Growth of innovative SMEs	# from 10<pp<50 to double, target is 8
Scale up SMEs	# from 50<pp<500 to double, target is 3
Global growth for SMEs in revenue	> 10%
# Spin-offs	8
# New businesses for large companies	5
# New business partnerships	20

Green can be measured after 4 years (incl. budget and effort); the values refer to running projects. Orange will be measured after 8 years, but only includes the figures and (partial) impact of the finished and running projects so far.

4.4. Long-term targets (8 years) and expected impact

Start date	1-7-2021
Number of projects	140
Number of partners involved	1400
Number of SME partners involved	700
Stakeholder satisfaction of project Community	4 out of 5 (3 = good)
Exploitation results (new products/services/ systems)	1,200
Dissemination activities (publications/conferences)	2,000
Standardisation actions	200
Total effort	16,000 person-years
Total budget	€1920 M
Growth of micro innovative enterprise	# from pp<10 to double, target is 40
Growth of innovative SMEs	# from 10<pp<50 to double, target is 20
Scale up SMEs	# from 50<pp<500 to double, target is 7
Global growth for SMEs in revenue	> 25%
# Spin-offs	20
# New businesses for large companies	12
# New business partnerships	50

Green can be measured after 8 years (incl. budget and effort, values refer to running projects). Blue can be measured after the closure of the projects (12 years).

The total budget as mentioned reflects the budget for the single Cluster bottom-up Calls as well as the ITEA budget for Joint Calls. The KPIs that are related to specific products and activities (exploitation, dissemination and standardisation) will be measured on individual company level.

5 Enhancing from established roots

ITEA 4 will build further on its strong legacy from ITEA 3, including its:

- bottom-up project generation in support of different types and phases of software innovation;
- flexibility to maximise business results and impact;
- market-oriented way of working;
- inter-governmental approach;
- multi-dimensional concept of excellence for project selection;
- strong sense of an open Community, easily accessible by industry, SMEs and RTOs;
- unique coaching culture from industry;
- strong history of success stories as a basis of trust for the future.

To further improve, ITEA 4 under the Eureka Clusters Programme will focus on:

- *Continuously increasing customer orientation and accelerating market impact*
 - ITEA will set up a customer advisory board for a set of key ITEA challenges to steer ITEA proposals in a successful way, to test the innovation at an early stage on a full scale and to prepare the market for the next innovation.
 - ITEA will ensure participation in customer-oriented events for each ITEA challenge, to prepare the market for the upcoming leading-edge products and services and thereby accelerate market acceptance.

- *More support for innovative SMEs.*
 - ITEA will mobilise the large companies to boost the best SMEs in the global market and add new KPIs for the growth of these innovative SMEs.
- *Better system overview.*
 - Through synthesising innovations done in a domain by different projects (e.g. ITEA 3 modelling, simulation, digital twin overview), ITEA 4 will strengthen each innovation by cross compatibility, enabling the players to play pivotal role on a global level. This overview will be incorporated across the whole Project Management Value Chain. As such, it will create possibilities to look beyond the borders of ITEA and explore opportunities and propositions in collaboration with new parties and the Eureka Clusters within the ECP.
- *Being a toolbox for Public Authorities and industry.*
 - The flexible structure of ITEA enables the possibility to design a new Call type or a new event to take action for urgent needs.
- *Joining forces with the Eureka Clusters.*
 - ITEA will strive to be at the heart of the new ECP. As open innovation Community there is a need for new knowledge, new players and new solutions. Active cooperation with other Cluster Communities, e.g. by designing extra thematic Calls based on the national priorities defined by Public Authorities, will engage this need and increase the innovation level and impact of all Clusters involved.



ITEA 4 will stimulate and boost innovative changes and partnerships that will further strengthen our international ecosystem and lead to massive impact and a leading position in software innovation and digital transition. ITEA 4 will actively push for cross-border, disruptive innovations in the new Eureka Clusters environment, in close cooperation with Public Authorities and other Eureka Clusters. ITEA 4 will master the new massive trends in the market that help create wellbeing and sustainability in society.


ITEA 4 *the future*

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