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The Urban Lab of Europe !

# The AS-Fabrik Project Journal N°2

*Project led by the City of Bilbao*



**JOBS & SKILLS  
IN THE LOCAL ECONOMY**



# The AS-Fabrik project

Considering the challenge faced by manufacturing industries in the Bilbao area that are moving towards a 4.0 dimension, the AS-FABRIK project seeks to increase the competitiveness of the advanced services sector of Bilbao (Knowledge intense Business Services – KIBS), that will prepare current or future workers of the KIBS sector, to acquire the needed skills, in order to supply digital transformation demands.

Bilbao City council is therefore leading a strategic alliance between leading businesses and universities, local service providers and entrepreneurs, in order to shape a collaborative pilot ecosystem based on innovative pillars and hosted in a tailor made space for experimentation and incubation of new services. New education programs for university students, entrepreneurs and professionals addressing the new challenges of the industry 4.0 and the digital economy will be tested, while networking actions among the main stakeholders, supported by tailored IT tools, will ensure a good match between demand and supply. New business models will be prototyped to support specialised start-ups that will benefit from a Minimum Viable Product (MVP) test Fab Lab for the market validation of new products/services.

At the end of the project, KIBS providers from Bilbao will have access to AS-FABRIK, the “factory for the creation of advanced services for industry”, that will gather in a physical space an integrated kit of tools in order to shape new products and services for the new industry needs, and to reinforce their competitiveness. This new model will lead to create a new generation of young and advanced service providers able to supply the challenging digital transformation demands the manufacturing sector is growingly facing.

The content of this journal does not reflect the official opinion of the Urban Innovative Actions Initiative. Responsibility for the information and views expressed in the journal lies entirely with the author.

## Partnership:

- Ayuntamiento de Bilbao
- Bilbao Ekintza - Public Agency
- Mondragon Goi Eskola Politeknikoa J.M.A. S.COOP - Research Centre
- Mondragon Unibertsitatea Enpresagintza S.COOP - Research Centre
- MIK S. COOP - Research Centre
- GAIA - Association of Electronic and Information Technologies in the Basque Country - NGO
- Deusto Foundation - Basque Institute of Competitiveness - Research Centre
- Asoc. Cluster Audiovisual de Euskadi - EIKEN BASQUE AUDIOVISUAL - NGO
- Mondragon Centro de Promocion, S.COOP - Business Support Centre
- IDOM Consulting, Engineering, Architecture, S.A.U. (IDOM) - Private Company

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# 1. Executive Summary

This journal highlights the progress of the AS-FABRIK project in the last months. It focuses on Bilbao's innovative approach of developing Industry 4.0 competences, in the fields of digitalisation and servitization.

The journal starts by putting this challenge into an international context. Everywhere, industrial and service firms must transform themselves under the influence of fast development of (digital) technologies and market demands. Worldwide, a wave of new alliances can be observed, in which firms and knowledge institutes collaborate in new ways, to develop tools, business models, service concepts, education & training modules, etc.

AS-FABRIK is part of this movement, and is developing a locally-oriented multi-actor alliance in an innovative and unique way. In this journal, we highlight two key building blocks of this effort: a collaborative road mapping tool, and a set of interactive training courses for industry-related companies in the field of digitalization and servitization.

The road mapping tool is specifically designed to explore, in a precise and systematic way, how technology and market trends will affect the local economy in Bilbao and its surroundings. It helps participating firms to discover what skills and competences they need to cope with these trends, and, even more interestingly, it is a tool to identify new windows for interfirm collaboration, new common training needs, and viable business opportunities/value propositions for start-ups.

Second, we discuss in more detail the professional training modules that were developed and delivered so far in the AS-FABRIK project. They are not only a tool to transfer new insights to companies, but also served as a community-building catalysts for the companies that participated.

For both activities, we explain the progress, as well as the implementation challenges; also we reflect on the replicability in other cities and regions. The information for this journal comes first-hand from in-depth interviews with several key stakeholders in AS-FABRIK, the main ones being Eduardo Castellano, Jordan Guardo and Eli García. Also, we used the rich documentation delivered by the project.

## 2. Building competences for digitalisation and servitization

The industrial landscape is changing very rapidly, due to digitalisation and servitization (the growing service component in manufacturing; see box for more explanation). Technological changes are fast, clients are more demanding, new competitors enter the market, so Bilbao's manufacturing firms and service firms face strong pressure to stay ahead of the game.

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### What is servitization?

Servitization allows industrial firms to enhance their offer in the form of post-sales services with higher margins than the original industrial product. It can be an important source of recurring income during the product's lifecycle, and a way to increase customer loyalty. Digital technologies play a key enabling role: they can help to reduce production costs, but also to add functionality to products and value added for the client, such as pay-per-use contracts, remote monitoring, predictive maintenance, and recycling/circular economy concepts.

Servitization is not easy to implement, and it affects many aspects of the company. It implies a different relation with the client, but also asks for other types of revenue models, contracts, finance, marketing, insurance, etc. Thus, firms need to invest in new skills and competences.

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The question of industrial modernization, digitalization and servitization is not unique to Bilbao or the Basque Country; it is a key issue for any industrial company or region. Everywhere, we see the emergence of new types of alliances to tackle this complex challenge. One of the most prominent is the Cambridge Service Alliance (see box), in which big companies work closely together with academics, and created a

community to learn from each other, set up R&D and competence building programmes, and develop new approaches together. In Germany, the Fraunhofer Institute has set up similar types of alliances, more oriented towards particular types of industries. The emergence of these alliances underlines that **digitalisation and servitization are challenges that can no longer be addressed on the level of the individual company or university**; even large multinational companies with vast resources realise that innovation requires collaboration, knowledge exchange, and a community of co-creation and shared learning.

For Bilbao, the approaches of Cambridge and Fraunhofer are inspirational, and the leaders of AS-FABRIK have used insights from these cases to build up the programme. But it is not a copy: what makes the AS-FABRIK project unique is the localised approach, aiming is to develop a local/regional alliance (rather than a national global one) around digitalisation and industrial servitization. This urban/regional focus allows the participating firms (industrial firms and service providers) and knowledge partners to collaborate more deeply, closely and long-term; Moreover, a concrete location is being developed –the Beta Building, more on this in the previous journal- where the collaborations will physically take shape and place, where new prototypes can be developed, and where new start-ups will be incubated.

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### The Cambridge Service Alliance

The Cambridge Service Alliance is an international network of academics and industrialists that share experience, knowledge and insight in how to better design and deploy

high-performance complex service systems. They join forces to conduct practical research to improve the design and deployment of high-performance complex service systems; to create and develop industrially applicable tools and techniques that deliver competitive advantage; and to deliver education programmes to raise the skill levels of organisations. It was founded in 2010 by BAE Systems, IBM and the University of Cambridge's Institute for Manufacturing and Judge Business School.<sup>1</sup>

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This local approach has several other advantages. More than the top-notch alliances of global leaders, it is a more inclusive approach, also engaging the not-so-early adopters. And because the project is led by the city (rather than a company or a university) it allows for a more integrated approach, linking with relevant

local and regional policies in the fields of innovation, education, labour markets, start-ups, and the urban regeneration of Zorrotzaure, the place where the co-working building is being developed. Hence, **servitization and digitalisation are not considered as individual competitiveness challenges for firms, but embedded in a bigger vision of economic transformation of the city.** In particular, the aim in Bilbao is to further strengthen the local/regional knowledge-intensive business services (KIBS) sector.

The remainder of this journal focuses on two key activities in the AS-FABRIK project related to competence building: the road mapping exercise, and the training for company professionals.

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<sup>1</sup> <https://cambridgeservicealliance.eng.cam.ac.uk/>

### 3. Road mapping as a tool for competence management

It is easy to say that the **manufacturing and service industry in the region will need new competences, skills and approaches to remain cutting edge in Industry 4.0. But it is an art – and hard work – to find out what exactly needs to be done, how, and by who.** What competences are lacking, which players in the ecosystem can be complementary, what kind of new start-ups have a high chance of success; what kind of new courses are needed, how exactly are technology and market trends affecting the industrial and innovative business service firms?

To address these issues, the knowledge partners of AS-FABRIK (MIK and Mondragon University Enpresagintza), led by Luis Berasategi, elaborated a sophisticated approach, with a road mapping method at the heart of it. In a very systematic way, groups of company representatives (from industry and services) and experts analysed, in ½ day sessions, which new technologies are emerging, how they will affect industrial companies, and what that implies for their operations, for their business models, the skills of their staff, the education programmes of the universities, and new types of collaborations. In a second round, the groups did not start from new technology challenges but from market trends: what are clients asking for in terms of new services, contacts, technologies, specifications; what new markets

are evolving; how does all that affect a business' operations, technology, skills etc? The exercise was done by both industrial companies and services companies (offering technology solutions & advanced services).

For the individual participating companies, this road mapping exercise helped immediately to gain a clearer view on the challenges ahead, with implications for their business. But on the collective level, it also created valuable insights into common challenges that might ask for collective action, and, even more interesting, new matches for collaboration between companies in the ecosystem, and “white spots” where start-ups might have a good chance to address unfulfilled needs in the local market.

As such, road mapping is not new; it is commonly used in business as a forecasting and strategy tool. But **the type of “collaborative” road mapping, as applied in AS-FABRIK, is very innovative:** it helps to identify new matches between companies in the ecosystem that might lead to new types of partnerships; it also contributes to find challenges that might need a common rather than individual approach, and to discover new, underserved market niches where start-ups might have a chance to develop a new business. Finally, the sessions helped to assess the offer of education in the region, both for professionals and in in the regular education system.

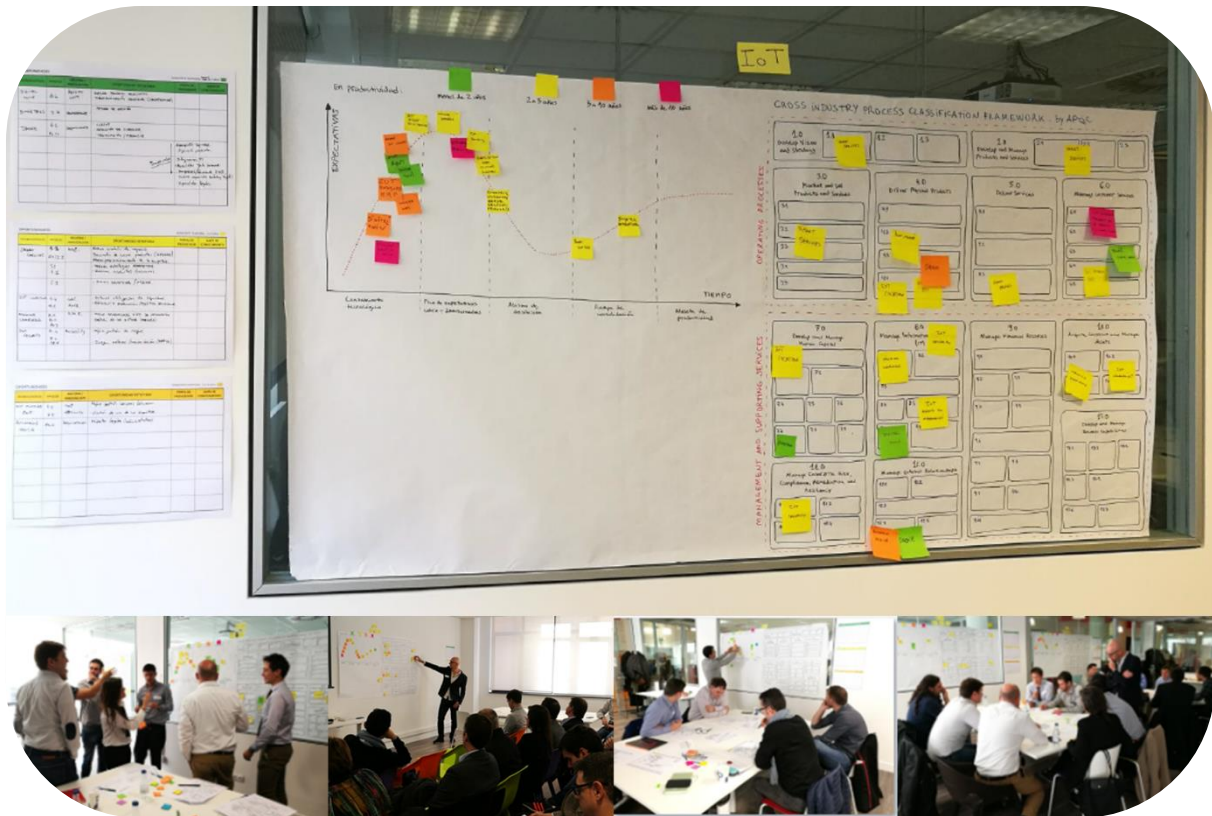


Figure 1: Images from the road mapping sessions

The first run of the road mapping exercises can be considered a success already, with 32 participants in the technology push session and 31 in the demand pull session, yielding a wealth of new information, and an inventory of new collaboration opportunities. It remains to be seen whether the companies will remain on board during the subsequent phases of the project, where the actual collaborations will take shape, start-ups will be founded and supported, and firm-specific training will be developed, but the indications so far are positive. The two key ingredients for success, according to Eduardo Castellano and Jordan Guardo, are **very solid preparation** (that eats up 90% of the project's time), and **having a trusted position amongst companies in the region**, so that they are willing to invest time and actively participate, having confidence that a useful

result will come out of it. A challenge in this respect was to engage a sufficient number of industrial companies. They tend to be very busy, especially now that the economy is booming again, and it took quite some effort to convince them to participate. In the remainder of the project, this issue will undoubtedly recur, as more road mapping sessions are planned. In this connection, it helps that Mondragon University is a leading player, with its solid reputation as “hands-on” pragmatic university, and with access to a vast network of companies in the MONDRAGON Corporation.

In a later “zoom-in” report (scheduled for June 2018), we will elaborate further on this innovative road mapping approach. For now, we turn to the next milestone of the AS-FABRIK project: the delivery of training courses for professionals.



## 4. A new type of training courses

An important part of AS-FABRIK is the delivery of training courses in the field of digitalisation, for professionals working either in the industry or in the knowledge-intensive business sector. Progress in the delivery of training courses has been very good, with some positive surprises but also difficulties. What has happened in the last months, and what can other cities/regions learn from it?

During the last six months, Mondragon University, led by Eduardo Castellano and Eli García, seasoned professors in the field, developed and ran a series of courses for professionals, meant to enhance their “servitization” and “industry 4.0” skills.

Some courses are rather technical, about data science, embedded systems, or advanced service design; others focus more on the side of business development: servitization (i.e. developing a service-oriented business model) and the finance of entrepreneurship. Also, in-company training modules were developed, for companies that need more intensive training on site. And finally, Mondragon University and Deusto set up a dedicated course for policy makers, about Industry 4.0, from the idea that policymakers should be up to date with what’s going on in this complex world of industry digitalisation.

To understand how the courses are delivered, let’s take the example of the course on servitization that ran from September to December 2017. It was set up as an eight week expert course (half day per week), where the participants (23 in total) learned the ins and outs of servitization. Each session starts with a masterclass; next, a professional from a “best practice” advanced company takes the floor, presenting practical examples of servitization; and finally, there is a workshop, in which

participants have to apply the newly learned insights to their own situation, helped by their peers and the experts. The course ended with a challenging assignment: each participating firm had to propose a concrete business project on servitization, to be elaborated in the next 12 months.

It was here that **something unexpected happened: the course was over, but participants said they wanted to stay together as a group, and keep on helping each other during their project.** They decided to continue meeting, every six weeks, to share their progress. Mondragon University was willing and ready to moderate this new ‘community of practice’, and turn it into a practice community. In September 2018, the course will be repeated, for a new batch of firms, and it is envisioned that members of the community of practice will play their role as experts. The courses are one element of the AS-FABRIK project, and they will be repeated several times during the project’s timeline. To promote them, Mondragon University developed a Webinar, with a summary of the highlights of the course. About 64 companies attended, and some of them will join the next run.

Looking back, the easiest part was the design of the courses. Mondragon University has experience in this field, it has run comparable course modules before, and Mondragon’s staff could mobilise experts from their international network of leading Industry 4.0 experts, for example from Cambridge University (UK) or Fraunhofer Institute (Germany). The harder part was to convince company professionals to participate, especially people from industrial firms. The main reason, again: the crisis is over, their order books are more than full, and the operational challenges for companies are

overwhelming. This has a double complicating effect: first, people have less time to spend on innovation and business renewal because they are too busy with day-to-day work, and second, there is less of a sense of urgency among company leaders to innovating their business. For the AS-FABRIK project as a whole, **it will be a major challenge to keep the industrial sector on board to a sufficient degree.** Not only in the courses, but also in the many other activities, industrial companies are supposed to play an important role. Eduardo Castellano and his team are very aware of this. They realise that the regional industry needs a fundamental digitalisation transition in order to remain competitive in the longer run, and be prepared to thrive in the inevitable next stage of the business cycle that will come in the following years. Their strategy is to develop activities that not only enhance the longer-run competitiveness of firms, but also bring more direct and practical benefits for the participants.

**Another challenge is to increase the participation of demand-side industrial companies from a more diverse background.** Currently, 75% of the participants are from members of the MONDRAGON Corporation. This is understandable given the close relationships between these firms, and the links with Mondragon University. But to enlarge the

regional impact of the programme, a wider participation is desirable. The plan is to continue the project promotion and recruitment through various channels, but it demands more time and effort than expected. Supply-side knowledge-intensive business service firms from Bilbao are very well represented in the Industry 4.0 training courses, e.g. embedded systems, cloud & data analytics courses.

## Programa

Jornadas	
#1	<b>CREANDO VALOR MEDIANTE LA SERVICITIZACIÓN</b> Qué es la Servitización. Conceptos y visión de los servicios avanzados: elementos de la servitización, sus características, ventajas e implicaciones. Prácticas y tecnologías que las empresas líderes emplean para ofrecer servicios avanzados.
#2	<b>SITUACIÓN DE LA SERVICITIZACIÓN EN LA INDUSTRIA INTERNACIONAL Y VASCA</b> Estado de la servitización por sectores. Servicios-producto frente a servicios-cliente según las condiciones industriales. Facilitadores e inhibidores en la adopción de servicios, desde la perspectiva del cliente y el fabricante.
#3	<b>TECNOLOGÍAS SERVICE 4.0 EN LOS SERVICIOS POSVENTA</b> Estrategia de mantenimiento posventa en base a la criticidad fiabilidad- coste. Dimensionamiento de recursos SAT y programación dinámica de tareas de mantenimiento. RAM-LCC y servicios posventa orientados al cliente.
#4	<b>TECNOLOGÍAS INDUSTRY 4.0 (CPS – IOT) COMO SOPORTE A LA SERVICITIZACIÓN</b> Potencial de las tecnologías sensorica inteligente, sistemas embebidos, middleware y comunicaciones en el desarrollo de servicios industriales avanzados. Estrategias y procesos que las empresas líderes aplican.
#5	<b>TECNOLOGÍAS INDUSTRY 4.0 (CLOUD – DATA ANALYTICS) COMO SOPORTE A LA SERVICITIZACIÓN</b> Potencial de las tecnologías Cloud & Data Analytics en el desarrollo de servicios industriales avanzados. Estrategias y procesos que las empresas líderes aplican.
#6	<b>DISEÑO DEL PROCESO DE SERVICITIZACIÓN Y SU DESPLIEGUE</b> Diseño de servicios avanzados: fases, metodologías y herramientas. Diseño de los procesos de negocio y sistemas de entrega de servicios avanzados. Métricas de desempeño del servicio.
#7	<b>INNOVACIÓN DE LOS SERVICIOS INDUSTRIALES</b> Representación de la oferta actual de la empresa en clave Sistema-Producto-Servicio (SPS). Ideación de nuevos SPS. Integración y valoración de los nuevos SPS en la propuesta de valor de la empresa.
#8	<b>INNOVACIÓN DEL MODELO DE NEGOCIO Y EMPRENDIMIENTO MEDIANTE LA SERVICITIZACIÓN</b> Evolución de los modelos de negocio desde la perspectiva de la servitización. Prácticas que los principales proveedores de tecnología emplean en sus modelos de negocio de servicio. Emprendimiento tecnológico en Servitización: Bilbao AS FABRIK.

Cada jornada está estructurada en tres tipos de sesiones:

- **MASTERCLASS.** Formación en conceptos, metodologías y herramientas para servitizar la oferta industrial.
- **CASO DE EMPRESA.** Casos empresariales de éxito para el intercambio de experiencias y prácticas.
- **WORKSHOP.** Taller para la reflexión individual y grupal sobre retos en servitización de las empresas industriales asistentes.

Figure 2: Leaflet on the course on servitization

## 5. Conclusions and next steps

In the previous sections, we discussed how the AS-FABRIK tackles the challenge of building regional competences for Industry 4.0 in an innovative way, focusing on two main elements of the programme: the road mapping exercise, and the training courses for professionals.

The collaborative road mapping tool, tailor made for AS-FABRIK, is a promising and innovative way to systematically assess Industry 4.0 challenges and competences in the region, to find white spots, to discover concrete opportunities for interfirm collaboration, to identify training needs, and to discover where start-ups can find and explore a niche market. In a later “zoom-in” paper, we will explore the method more in-depth. The training courses, developed by Mondragon University, helped firms to be prepared and to actively work on new solutions during the course, and already resulted in a community of practice run by alumni firms.

The setup of the road mapping exercise and expert courses can serve as example for other cities or regions. They help in bringing digital skills into industrial and service companies, but also to create a collaborative innovation community, with longer lasting positive effects on the competitiveness of the entire region. However, replication is by no means easy. First, **success depends on the presence of a university or knowledge institute with a high level of practical expert knowledge and experience** (both in technical and business aspects of digitalisation), and a large network in the local industry. Not all regions are so lucky to have such an institute within their borders.

Second, success depends on the willingness and receptiveness of local businesses to enter in such courses and working sessions. After all, you may end up in a room with your competitors.

Thus, **it requires a certain level of trust and cooperative spirit**. In the Basque Country, this spirit is clearly present. In the case of Bilbao, demand-side industrial participants in the courses (about 75%) are part of the MONDRAGON Cooperative Corporation, and already has some form of collaborative ties. This cooperative structure is rather unique for the Basque Country. Also, companies share a strong local cultural identity, and a collective ambition to keep the Basque Region as leading industrial power in Spain and Europe.

We must conclude that the success of both at least partly rests on the “collaborative capital” in the MONDRAGON Cooperative Corporation: Mondragon University is a central player in the course design and delivery, and companies from the MONDRAGON Corporation form the majority in the course attendants and participants in the road mapping activity. **A lesson for other cities that consider a similar approach to connect closely to existing triple helix networks and industry associations.**

It is some sort of paradox that innovation can be more difficult in a booming economy and filled order books. Firms have less time for innovation sessions, and tend to give priority to day-to-day operational activities. **This asks for a careful timing of activities, using evening or weekend time slots for training sessions and workshops.** Also, the value added for companies must be made very clear.

One key challenge in the project, recognized by the stakeholders, is to **address and convince the “less receptive” companies** to take part in the journey of modernization and participate in the AS-FABRIK events and activities; some firms are very open to new approaches, but others much less so. This holds especially for smaller, more traditional manufacturing companies.



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Urban Innovative Actions (UIA) is an Initiative of the European Union that provides urban areas throughout Europe with resources to test new and unproven solutions to address urban challenges. Based on article 8 of ERDF, the Initiative has a total ERDF budget of EUR 372 million for 2014-2020.

UIA projects will produce a wealth of knowledge stemming from the implementation of the innovative solutions for sustainable urban development that are of interest for city practitioners and stakeholders across the EU. This journal is a paper written by a UIA Expert that captures and disseminates the lessons learnt from the project implementation and the good practices identified. The journals will be structured around the main challenges of implementation identified and faced at local level by UIA projects. They will be published on a regular basis on the UIA website.