

FINAL ACTION PLAN LOMBARDIA REGION-

FULL VERSION IN ITALIAN

D.T4.2.3 - Final action plan for each region



CAPITOLO 1

1.1 IL PROGETTO ECOS4IN

I processi di trasformazione in ottica 4.0 mettono seriamente in discussione paradigmi e pratiche storiche consolidate, in particolar modo nelle piccole-medie imprese che sono una componente fondamentale del tessuto industriale e terziario di Regione Lombardia.

Purtroppo le PMI lombarde non hanno la capacità relazionale, umana e/o le risorse tecniche per entrare a far parte delle reti di innovazione tecnologica come nel caso delle grandi imprese/multinazionali coinvolte in agglomerati di innovazione tecnologica (es. Accademy, Parchi Scientifici e Tecnologico, ecc.)¹. Tale mancanza si traduce soprattutto in una maggiore difficoltà di realizzare formazione professionale, al fine di accrescere le competenze dei lavoratori. In generale, l'Industria 4.0 è una rivoluzione inevitabile che riguarda tutti i settori economici e il suo impatto positivo o negativo dipenderà dalla capacità di un determinato contesto di rispondere, accettare ed adottare i cambiamenti.

A tale scopo è nato il progetto internazionale ECOS4IN (Ecosistema² Internazionale per l'Industria 4.0), che attraverso la cooperazione transnazionale di soggetti coinvolti in *strategie di specializzazione intelligente* (RIS3) e di processi di implementazione dell'Industria 4.0, intende rafforzare le capacità di innovazione delle regioni, in modo da rendere il tessuto imprenditoriale locale pronto alle sfide del domani. In altre parole, ECOS4IN rappresenta una fonte di informazioni volta ad aumentare la consapevolezza sull'Industria 4.0 e favorire, attraverso la progettazione di un modello di ecosistema specifico, un piano d'azione volto alla revisione delle strategie RIS3.

Le fasi del progetto che sono state realizzate nel progetto ECOS4IN sono:

1. una preliminare analisi dell'attuale implementazione dell'Industria 4.0 nel contesto lombardo;
2. costruire un modello generale dell'ecosistema della conoscenza;
3. sviluppare un piano d'azione dedicato alle strategie di specializzazione della Regione Lombardia.

L'attuazione del progetto ha avuto il via ad aprile 2019 e si completerà nel marzo 2022; i sette partner coinvolti hanno costruito un modello generale di ecosistema, declinato per ogni singolo contesto, attraverso le analisi SWOT³ e GAP⁴. In particolare, per ECOS4IN la *Gap Analysis* è stata condotta attraverso le seguenti fasi:

¹ In merito si rimanda ai report pubblicati dall'*Osservatorio Innovazione Digitale nelle PMI* (www.osservatori.net).

² L'idea di un ecosistema della conoscenza è un approccio alla gestione della conoscenza che pretende di favorire l'evoluzione dinamica delle interazioni della conoscenza tra le entità, per migliorare il processo decisionale e l'innovazione attraverso reti evolutive migliorate di collaborazione. In contrasto con gli sforzi di gestione puramente direttivi che tentano di gestire o dirigere i risultati, gli ecosistemi della conoscenza sostengono che le strategie della conoscenza dovrebbero concentrarsi maggiormente sul consentire l'auto-organizzazione in risposta ai cambiamenti degli ambienti.

³ L'analisi/matrice SWOT (*Strengths, Weaknesses, Opportunities e Threats*) è una matrice 2x2 in cui i fattori interni ed esterni che hanno un potenziale impatto, positivo o negativo sul business o sull'attività che si vuole realizzare sono opportunamente identificati e organizzati. Calicchio, 2017, *La swot analysis in 4 step*, Kobo E.book.

⁴ Una *gap analysis* è uno studio formale di ciò che un'organizzazione sta attualmente facendo, dove vuole andare e come è possibile colmare il divario fra queste due cose. Questa analisi può essere condotta da varie prospettive e, di conseguenza, esistono diversi tipi di metodologie per realizzarla.

- *Swot Analysis* che ha permesso di descrivere lo stato attuale dell'Industria 4.0 nella Regione Lombardia (un'istantanea degli sforzi e degli indirizzi strategici nell'area 4.0 da parte della pubblica amministrazione nazionale e regionale);
- Rilevazione e analisi del *gap* tra il contesto attuale di Industria 4.0 di Regione Lombardia e il modello di ecosistema 4.0.

Al fine di raggiungere gli obiettivi del progetto, accanto alle analisi, ciascun partner ha ideato e realizzato un progetto pilota. L'Italia, rappresentata dalla Fondazione Brodolini, ha creato un progetto denominato *Human Capital Hub ECOS4IN*, fortemente focalizzato sul settore *food&hospitality*, in grado di coinvolgere un campione di PMI e studenti/under 30.

1.2 SCOPO DEL REPORT È DEFINIRE IL PIANO D'AZIONE PER LA LOMBARDIA

All'avvio del Progetto ECOS4IN nessuno poteva prevedere la peggiore recessione (nota come “*Great Lockdown*”) dai tempi del *crollo di Wall Street* del 1930, il terzo (forse il peggiore) *shock* economico, finanziario e sociale del XXI secolo, dopo gli attentati dell'11 settembre 2001 e la crisi finanziaria del 2008⁵. Secondo il Fondo Monetario Internazionale, le perdite complessive del PIL mondiale per la pandemia del Coronavirus ammonteranno a fine 2021 a quasi 9.000 miliardi di dollari⁶. A perdere saranno soprattutto determinati settori, direttamente colpiti dal *Lockdown*, come quello dei trasporti civili e industriali.

Il mondo occidentale ha realizzato che, a differenza di altre epidemie, come la SARS del 2003, questa sarà un'emergenza con la quale fare i conti in modo molto diretto e non marginale. Una rivoluzione culturale, alcune cose non torneranno alla normalità dopo qualche mese, l'isolamento e il distanziamento sociale risultano necessari per rallentare la diffusione delle varianti del virus, si tratta di un fenomeno sociale a cui dovremo abituarci a convivere e di conseguenza cambiare alcune nostre abitudini.

Nel 2021, il quadro durissimo del 2020 ha lasciato spazio nel 2021 ad una ripresa o meglio quello che tecnicamente si chiama “rimbalzo positivo”, nei primi tre mesi il tessuto imprenditoriale regionale guarda al futuro con ottimismo, in riferimento alla media del periodo pre-pandemia (2019) vede risultati straordinari: +3,9% per gli ordini interni e +4,6% per gli ordini esteri. Il tasso di occupazione in Regione Lombardia si attesta a quasi il 67% con un saldo positivo tra nuovi contratti e cessazioni⁷, le imprese stimano in 50mila le nuove entrate⁸ di cui il 30% risulta di difficile reperimento per mancanza di competenze dei candidati. Tale *mismatch* di competenze è molto più alto tra gli Under 30' (la difficoltà di reperimento media per Operai specializzati e Specialisti in scienze informatiche è superiore al 55%), un paradosso se consideriamo che il tasso di disoccupazione giovanile in Lombardia è di circa il 20% (contro il 17% della media UE).

A ciò si aggiunge che il futuro dell'industria lombarda potrebbe ulteriormente migliorare, in quanto la crisi sanitaria ha provocato un'ulteriore accelerata (già avviata con la guerra commerciale USA -Cina)

⁵ Sezione Economia, 2020, *Per l'Oce l'impatto del coronavirus sull'economia già supera le peggiori previsioni*, 2020, AGI.

⁶ Gopinath G., 2020, *The Great Lockdown: Worst Economic Downturn Since the Great Depression*, Ifm Blog, 2020.

⁷ Flussi in uscita ancora ridotti rispetto ai valori pre-pandemia anche per effetto del cosiddetto “blocco” dei licenziamenti e dell'utilizzo intensivo della Cassa integrazione. Unioncamere, 2021, *Il mercato del lavoro in Lombardia 1° trimestre 2021*.

⁸ Unioncamere, 2021, *EXCELSIOR Informa i programmi occupazionali delle imprese rilevati dal sistema delle Camere di Commercio*.



dell'*insourcing* di attività manifatturiere in Europa, spingendo molte imprese, grandi e piccole, a riorganizzare le proprie catene di fornitura⁹.

Da una parte è necessario sostenere le PMI nel loro processo di innovazione e nell'acquisizione di tecnologie 4.0, anche attraverso una riprogettazione dell'organizzazione aziendale; dall'altra è necessario attrezzare il sistema educativo italiano in termini di formazione e competenze legate alle tecnologie avanzate, attualmente un limite del sistema e fonte di grande preoccupazione dall'industria robotica italiana.

All'interno di questo processo in continua trasformazione per il settore produttivo si colloca il progetto ECOS4IN, il cui scopo è migliorare l'implementazione della quarta rivoluzione industriale in Regione Lombardia.

Il progetto ha innanzitutto svolto un'accurata analisi del contesto economico lombardo, per creare successivamente uno strumento "*ECOS4IN Knowledge Base*", testato nel progetto pilota *Human Capital Hub*, progetto il cui scopo era quello di fornire ad un ristretto target di destinatari (PMI e nuove generazioni) le conoscenze necessarie per aumentare la loro consapevolezza sull'Industria 4.0.

⁹ Amighini A., 2020, *Le conseguenze del coronavirus sull'economia globale*, Ispi, 2020.

1.3 L'OBIETTIVO DEL PIANO D'AZIONE

L'obiettivo è stato quello di costruire un programma d'azione capace di promuovere specifiche “attività/condizioni” per affrontare il *post-emergenza*, partendo dagli aspetti prioritari del “nuovo mondo” in cui le imprese, gli operatori, gli stakeholder e i cittadini si trovano a vivere la loro nuova quotidianità reimpostata sull'innovazione, la sostenibilità e alla valorizzazione del capitale umano e della conoscenza. Lo sviluppo di azioni a sostegno dell'industria 4.0 non riguardava solo l'offerta “tradizionale” del tessuto manifatturiero del territorio lombardo, ma intendeva raggiungere, per quanto possibile, senza distinzione di settore o di filiera, il maggior numero di aziende della Regione.

Verso questa direzione si è avviato il progetto pilota nell'Hub di Milano Luiss, un punto unico di accesso per l'Industria 4.0 e la fabbricazione digitale volto a facilitare la creazione di nuove sinergie tra PMI, comunità e studenti attraverso attività di contaminazione, eventi e webinar. Le cui azioni hanno avuto un impatto positivo che continuano ancora oggi e vanno oltre i partecipanti, estendendosi alla comunità imprenditoriale milanese ed in generale alle persone interessate ai temi dell'Industria 4.0.

Inoltre, la progettazione di un InfoHub 4.0 rispondeva a due concetti chiave, la “sostenibilità”, ovvero il progetto doveva coerentemente incorporare ed accompagnare quanto previsto dalle strategie regionali di specializzazione intelligente (RIS3)¹⁰ e la “trasferibilità” ovvero il Human Capital Hub ECOS4IN si doveva concentrare sulle esigenze dirette e pratiche del tessuto economico e politico della Lombardia, cercando di creare una sorta di “libretto delle istruzioni” per la Regione stessa, volto a raggiungere gli obiettivi esposti successivamente.

Sintesi Macro-obiettivi

- 1.4 Aumentare le capacità di attuazione dei progetti innovativi da parte delle PMI
- 1.5 Sviluppare nuove competenze 4.0

A.1.1. 1.3.1 Pull e Open innovation per le Pmi

Le micro, piccole e medie imprese rappresentano la maggior parte delle imprese lombarde ed è pertanto fondamentale aumentare le capacità di attuazione dei progetti di innovazione da parte delle PMI attraverso la creazione di ecosistemi collaborativi che consentiranno l'adozione dell'*Open Innovation* (OI) all'interno della loro filiera produttiva. Ad esempio, attraverso tre specifiche azioni:

1. La possibilità di reclutare personale altamente qualificato e preparato;
2. Sostenendo non solo lo sviluppo di un piano strategico, ma anche la sua esecuzione;
3. Aumentando la sostenibilità finanziaria dei progetti di innovazione e facilitando l'accesso alle risorse finanziarie.

L'*Open Innovation* (OI) è un concetto ampiamente discusso e promosso nel settore manifatturiero da decenni, un approccio rivoluzionario volto a favorire che rivela nuovi modi di cooperazione e *business*, con l'obiettivo di portare sul mercato nuovi prodotti e servizi per battere la concorrenza o aprire nuove “nicchie” di mercato.

¹⁰ Per maggiori informazioni si veda: *Strategie di innovazione nazionali o regionali per la specializzazione intelligente (RIS3)*. Documento disponibile: https://ec.europa.eu/regional_policy/sources/docgener/informat/2014/smart_specialisation_it.pdf

Il nuovo contesto competitivo caratterizzato da richieste di flessibilità, personalizzazione, rapidi cicli di innovazione, dematerializzazione di prodotti e servizi forniscono il contesto ideale per l'adozione dei principi proposti da Chesbrough nel 2003¹¹, i quali si basano innanzitutto sul concetto di “open” delle funzioni di “Ricerca e Sviluppo” delle imprese, trasformandole in un sistema aperto e condiviso in cui le fonti di nuove conoscenze siano sia all'interno che all'esterno dell'organizzazione.

Un esempio perfetto di questo processo di condivisione della conoscenza proviene da *Fablabs* (*fabrication laboratory*), *makerspaces* e *hackerspace* che sono diversi tipi di laboratori di fabbricazione in cui attrezzature digitali come “Frese laser” e “Stampanti 3D” sono offerte al pubblico per creare prodotti autonomamente, promuovendo la cooperazione e facilitando anche la co-progettazione e lo scambio di modelli.

I *makerspace* o *FabLab* in Lombardia sono officine dotate di attrezzature “condivise” e dove si tengono attività divulgative o corsi per adulti o studenti per trasmettere conoscenze, rappresentano il modo in cui l'innovazione può essere realizzata dalle PMI in modo rapido, agile ed economico.

Due esempi di *makerspace* in Lombardia (Fablab Milano e Faberlab Tradate)



L'innovazione viene implementata lungo una catena del valore molto “corta”, in cui gli utenti di nuovi prodotti sono ideatori, che forniscono specifiche (e talvolta partecipano alla realizzazione), agli altri *maker* presenti nel *FabLab*. Si tratta di una sorta “fai da te” delle PMI industriale, “micro-fabbriche” pioniere di

A. ¹¹ Chesbrough H., 2003, *Open Innovation: The New Imperative for Creating and Profiting from Technology*, Harvard business school.



soluzioni ingegneristiche che possono portare a nuovi processi produttivi, macchine e prodotti con nuove funzionalità.

A.1.2. 1.3.2 Sviluppare nuove competenze 4.0

La domanda di lavoro nel settore manifatturiero lombardo lamenta un'elevata difficoltà di reperimento di professionisti specializzati ed esperti tecnici. In Italia la partecipazione ai Corsi di formazione 4.0 riguarda circa l'8,3 % della forza lavoro (in Francia è del 18,8%, in Danimarca o Finlandia supera il 25%) contro una media europea del 10,8%.

Le professionalità del futuro si evolveranno in profili strutturati per multi-competenze, acquisiti in contesti di apprendimento differenziati (formali, non formali, informali), con un ampio utilizzo dell'apprendimento e della formazione *on-the-job* (utilizzando ad esempio il contratto di Apprendistato). Tuttavia, allo stesso tempo, le risorse chiave nell'impresa 4.0 non si limitano esclusivamente alle abilità tecniche, il mondo del lavoro 4.0 richiederà sempre di più la creatività da applicarla a nuovi problemi e ideare approcci insoliti per affrontare problemi oggi non ancora definibili.

È necessario intervenire per dirigere il sistema di formazione ed istruzione al fine di incoraggiare lo sviluppo di competenze in linea con le esigenze professionali delle aziende 4.0. Tali competenze sono sempre più richieste e diventeranno centrali per affrontare la sfida della transizione verso la digitalizzazione del tessuto imprenditoriale, per favorire la trasmissione di tali conoscenze ed abilità il piano d'azione si poneva i seguenti obiettivi:

1. Ridurre (e in prospettiva colmare) il divario di competenze tra le esigenze delle imprese rispetto ai processi di digitalizzazione e Industria 4.0 e le conoscenze attualmente trasmesse dal sistema scolastico ed universitario.
2. Incoraggiare e rafforzare il livello di istruzione superiore tecnica (ITS), un percorso post-diploma alternativa al canale universitario, che secondo le associazioni datoriali rappresenta un formidabile collegamento tra formazione ed esigenze di medie-piccole imprese con un'elevata tradizione manifatturiera.
3. Creare una cultura diffusa, fin dalla scuola primaria, favorevole all'innovazione e alla digitalizzazione come opportunità di crescita personale e sociale in una prospettiva sostenibile e coesa.

La nascita dei *Competence Center*(CC)¹² e dei *Digital Innovation Hub* (DIH)¹³, previsti nel Piano Nazionale varato nel 2016, introduce due nuovi protagonisti nel sistema di istruzione e formazione regionale.

In dettaglio, *Digital Innovation Hub* da un lato, rappresenta il "collante" in grado di mettere in contatto i vari pubblici e attori privati che si trovano ad agire sul territorio; dall'altro, accompagna le imprese verso

¹² I Competence Center, realtà che fanno capo ad alcune università italiane, hanno l'obiettivo di intensificare rapporti tra ricerca e industria. Ad esempio, a Milano il MADE *Competence Center* è una fabbrica digitale e sostenibile che supporta le imprese manifatturiere nel percorso di trasformazione digitale verso l'Industria 4.0. Mette a disposizione un ampio panorama di conoscenze, metodi e strumenti sulle tecnologie digitali che spaziano dalla progettazione all'ingegnerizzazione, dalla gestione della produzione alla consegna, fino alla gestione del termine del ciclo di vita del prodotto. Link: www.made-cc.eu

¹³ Struttura aderente a Confindustria e R.ETE. Imprese, un DIH è specializzata in tutte quelle che vengono convenzionalmente considerate tecnologie abilitanti fondamentali e ha come obiettivo rafforzare il livello di conoscenza e di consapevolezza delle imprese rispetto alle opportunità offerte dalla trasformazione digitale, anche nell'ambito del Piano Nazionale Industria 4.0 e della Strategia Europea per la Digitalizzazione dell'industria (DEI). A regime i *Digital Innovation Hub* saranno 21 come il totale delle Regioni e Province Autonome.

la quarta rivoluzione industriale, offrendo alle PMI i servizi di cui hanno bisogno e indirizzandoli ai *Competence Center*.

Più nello specifico, si riassumono di seguito i molteplici obiettivi che il DIH intende raggiungere:

- sensibilizzare le imprese sulle opportunità derivanti dall'Industria 4.0 fenomeno;
- fornire un supporto concreto nella pianificazione di investimenti innovativi;
- un successivo rinvio ai CC attraverso i quale possono fornire un vero e proprio servizio di tutoraggio;
- ultimo ma non meno importante, il supporto alle imprese nell'ottenimento di finanziamenti pubblici e privati.

Per essere raggiunti, gli obiettivi sopra elencati richiedono naturalmente il contemporaneo coinvolgimento di numerosi e diversi attori: Centri di Ricerca, Cluster, Enti Locali, Fablab, Start-Up Incubatori, Investitori, Parchi Scientifici e Tecnologici, Attori industriali e Università.

Se i *Digital Innovation* rappresentano per le aziende la porta d'ingresso verso Industria 4.0, grazie ai servizi offerti per l'introduzione delle tecnologie, i CC rappresentano di fatto la loro forza trainante, essendo la ricerca e poli di innovazione strettamente legati alle Università, in grado di fornire competenze di altissimo livello e professionalità sulle tematiche relative al paradigma 4.0. In dettaglio, i tre principali obiettivi che i CC si prefiggono sono:

- supportare le aziende nella valutazione del loro livello di maturità digitale sviluppando e sviluppando strumenti volti a condurre valutazioni ad hoc;
- formare i dipendenti aziendali, promuovendo e diffondendo le competenze 4.0, attraverso percorsi formativi sia in aula e direttamente sulla linea di produzione;
- realizzare progetti di ricerca industriale, innovazione e sviluppo sperimentale.

L'obiettivo del piano d'azione regionale è quello “sfruttare” positivamente la presenza di nuovi attori che possano dar luogo allo sviluppo di positive sinergie evitando il più possibile fenomeni dannosi di duplicazione e sovrapposizione. E' necessario che si sviluppi tra DIH e CC un confronto che porti una maggiore consapevolezza nella capacità delle aziende di vincere la sfida del passaggio alla digitalizzazione del tessuto aziendale attraverso il reclutamento di personale che abbia sviluppato competenze e conoscenze sulle tecnologie 4.0. Va da sé che il requisito principale a cui i DIH e CC cercano di rispondere è quello di contribuire in modo decisivo allo stimolo dell'Industrializzazione 4.0, di conseguenza, la collaborazione tra il tessuto imprenditoriale delle PMI lombarde e le diverse componenti del sistema formativo (istituti scolastici, CFP, ITS, IFTS, Università, mondo delle imprese, ecc.) diventa un fattore cruciale.

CAPITOLO 2

2.1 IL CONTESTO DEL PIANO D'AZIONE LOMBARDO (TRA ECOSISTEMA E REALTÀ)

A.1.3. 2.1.1 Azioni di Regione Lombardia in merito all'Industria 4.0

In questo contesto di profondo cambiamento tecnologico e digitale, negli ultimi anni in Italia diverse politiche si sono susseguite linee, in parte suscitate da quanto stava avvenendo a livello europeo, tese a promuovere e incentivare il passaggio del tessuto imprenditoriale nazionale al paradigma 4.0.

La Lombardia è stata la prima regione italiana che ha deciso di affrontare il tema della quarta industriale rivoluzione, regolandola attraverso una legge approvata il 10 aprile 2015 dal titolo *Fabbricazione 4.0*, sulla base delle prerogative ad essa affidate dall'articolo 117 della Costituzione.

A seguire, nel settembre 2016 il Governo ha presentato il previsto Piano Industria 4.0 contenuto nella Legge di Bilancio 2017, approvata definitivamente il 7 dicembre 2016. Il provvedimento nasce con l'obiettivo di mobilitare ulteriori investimenti privati e propone un mix di tassazione incentivi, sostegno al capitale di rischio, diffusione della banda ultralarga, formazione dalle scuole al università, con l'obiettivo ultimo di favorire e incentivare le imprese ad adeguarsi e aderire alla quarta rivoluzione industriale.

Nel 2020 il Governo Italiano ha approvato il progetto “Punto Impresa Digitale” (PID), nell'ambito delle attività previste dal Piano Transizione 4.0, l'obiettivo del piano è il seguente:

- promuovere l'utilizzo da parte delle MPMI lombarde di servizi o soluzioni focalizzati sulle nuove competenze e tecnologie digitali in attuazione della strategia definita nel Piano Transizione 4.0;
- favorire interventi di digitalizzazione ed automazione funzionali alla continuità operativa delle imprese durante l'emergenza sanitaria da Covid-19 e alla ripartenza nella fase post-emergenziale;
- incentivare modelli di sviluppo produttivo *green* orientati alla qualità e alla sostenibilità tramite prodotti/servizi con minori impatti ambientali e sociali.

Si tratta di interventi, ripresi anche nel Piano Nazionale di Ripresa e Resilienza (PNRR), in linea con gli orientamenti già avviati in Lombardia e che hanno già consentito di mettere in campo risorse a sostegno del sistema economico regionale. Tra gli elementi più innovativi adottati dal legislatore lombardo, vale la pena citare:

- la realizzazione della terza edizione del bando “Sviluppo di soluzioni innovative Impresa 4.0” a sostegno di progetti prontamente cantierabili e con potenziale interesse di mercato con particolare attenzione a soluzioni digitali nell'ottica della sostenibilità.
- Il bando “Voucher digitali I4.0” ha l'obiettivo di rispondere ai bisogni di innovazione delle MPMI lombarde, tramite la digitalizzazione di processi, prodotti e servizi offerti. I progetti dovranno riguardare delle tecnologie di innovazione digitale 4.0.
- Il progetto “Testimone”, un intervento pilota avviato da Regione Lombardia per sostenere le imprese del territorio coinvolte in processi di passaggio generazionale o trasmissione d'impresa. La continuità d'impresa all'interno della compagine familiare nonché al di fuori di essa, rappresenta, uno dei problemi più delicati nel ciclo di vita delle MPMI lombarde. Il progetto, articolato in tre fasi, ha l'obiettivo di far emergere, partendo da casi concreti, delle modalità di intervento strutturali, diversificate e replicabili in tema di passaggio generazionale. La terza fase del progetto, che raccoglie

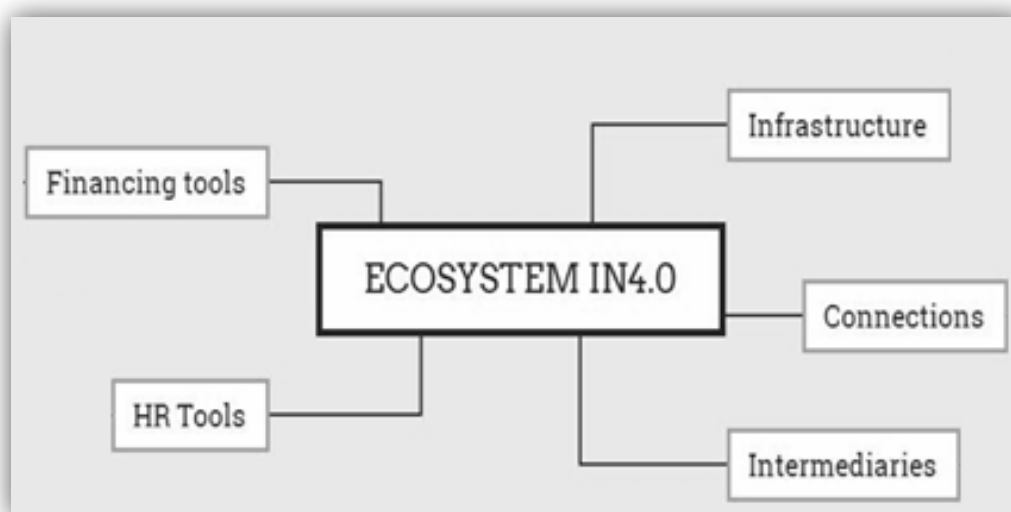
gli esiti delle prime due fasi, costituisce la messa a sistema di strumenti regionali e del sistema camerale volti a favorire la trasmissione d'impresa ed il passaggio generazionale nelle MPMI lombarde.

A.1. 2.1.2 Analisi SWOT in merito al Modello ecosistemico IN4.

Il 30 settembre 2019, i referenti regionali della Lombardia, operanti nel settore dell'istruzione superiore, sono stati invitati al primo meeting del gruppo di stakeholder regionali¹⁴ presso l'*Hub Milano Luiss* per makers e studenti. L'obiettivo principale dell'incontro è stato quello di discutere l'importanza di definire le competenze per l'industria 4.0.

Alla luce delle informazioni emerse, è stato possibile sviluppare una matrice SWOT(*Strenghts*, *Weaknesses*, *Opportunities* e *Threats*) relative al contesto lombardo del modello ecosistemico generale IN4.0.

Modello ecosistemico generale IN4.0



Il modello modificato dell'ecosistema regionale della conoscenza per l'Industria 4.0 mira al miglioramento del know-how necessario per lo sviluppo e l'utilizzo delle tecnologie dell'Industria 4.0. In altri termini, l'analisi Swot presentata nelle pagine successive serve per identificare ciò che è necessario sviluppare e ciò che sarebbe “bello avere” in Regione Lombardia..

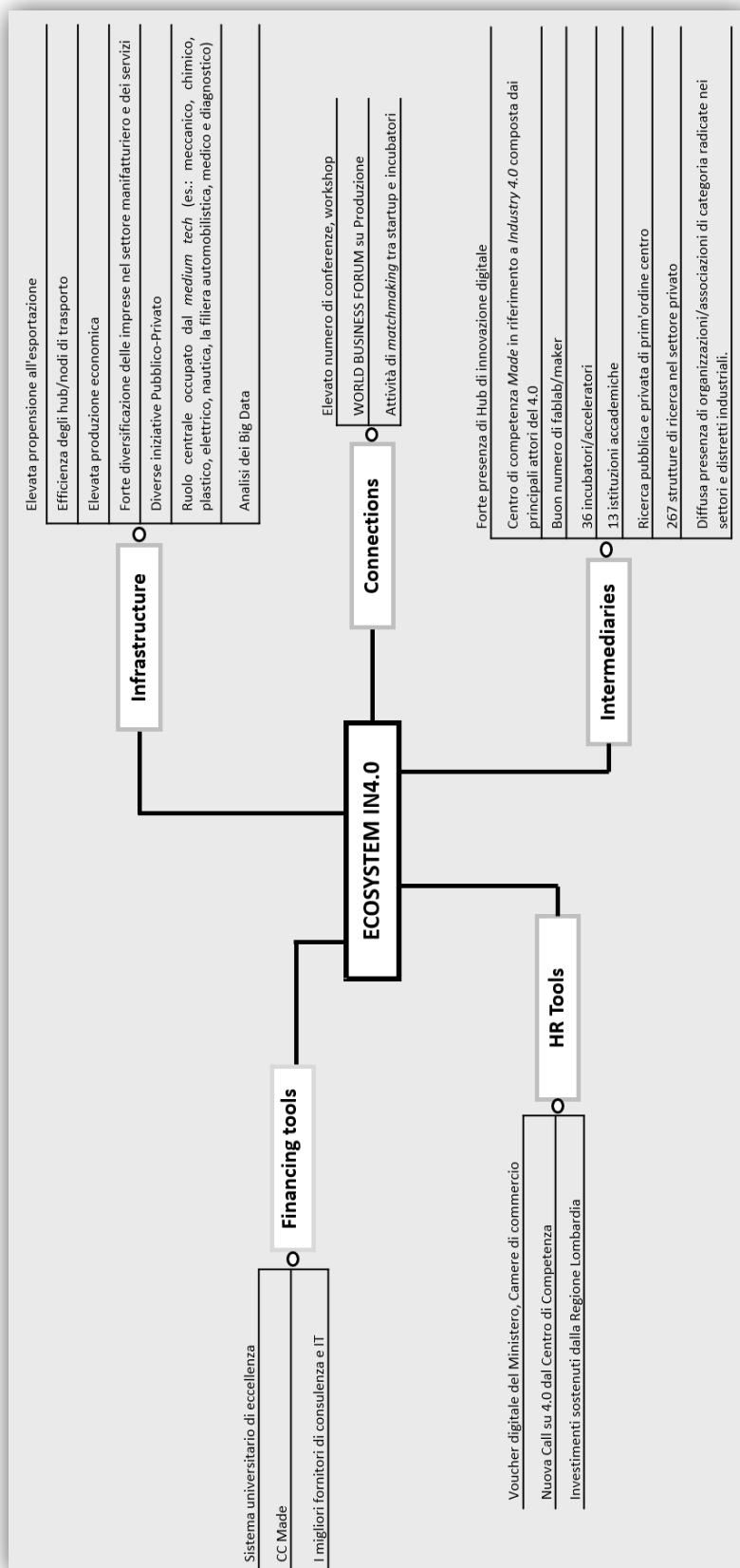
L'Europa centrale è un'area molto eterogenea, costituita da regioni sviluppate con sistemi di innovazione ben performanti, caratterizzate da forti legami tra i suoi attori, nonché da regioni per lo più rurali e periferiche caratterizzate da un basso livello di ricerca e sviluppo e da collegamenti deboli all'interno del sistema dell'innovazione, la Lombardia si colloca all'interno di una fascia intermedia tra questi due opposti.

¹⁴ Tra questi, si segnala: TheFabLab, Junior Achievement Italia, Università Luiss, FabriQ, Afol Metropolitana, In-Sprint, Agenzie di consulenza.

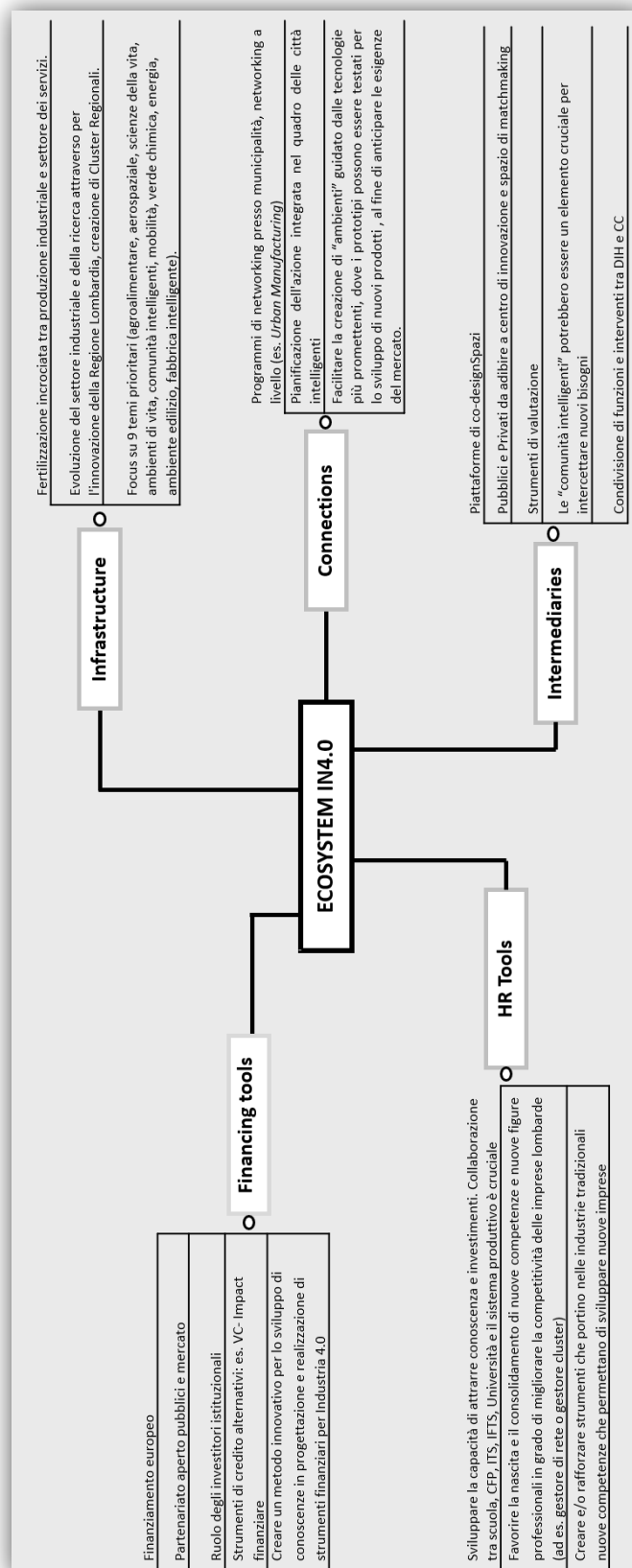
I punti di forza di Regione Lombardia sono tanti, si tratta della Regione economicamente più produttiva dell'Italia, si tratta di una realtà che conta già una presenta importante di *stakeholder* relativi all'industria 4.0 e come è stato precocemente accennato, il legislatore lombardo ha già avviato un processo di supporto all'accompagnamento delle piccole-medie imprese verso la quarta rivoluzione industriale. Tra le opportunità, si sottolinea la possibilità di attrarre investimenti internazionali ed una maggiore collaborazione con il sistema scolastico, volto a potenziare innanzitutto gli Istituti Tecnici Superiori. Tale sviluppo potrebbe a sua volta favorire la nascita e il consolidamento di nuove competenze e nuove figure professionali in grado di migliorare la competitività delle piccole-medie imprese lombarde.

Mentre per quanto riguarda i punti di debolezza, approfonditi nel prossimo paragrafo, vi troviamo certamente l'elevata frammentazione delle micro (nano) imprese lombarde, in grado di non accedere con frequenza all'innovazione che è disponibile soprattutto nelle aree urbane. A ciò si aggiunge un'elevata difficoltà delle imprese ad accedere al credito, perché spesso sprovviste di adeguate garanzie. Tuttavia, la priorità in merito allo sviluppo di un ecosistema regionale della conoscenza per l'Industria 4.0 è certamente il *mismatch* di competenze tra quanto richiesto dalle imprese e quanto oggi è in grado di proporre il sistema di istruzione scolastico. E' necessario salvaguardare e trasmettere il "saper fare", tipico della manifattura lombarda.

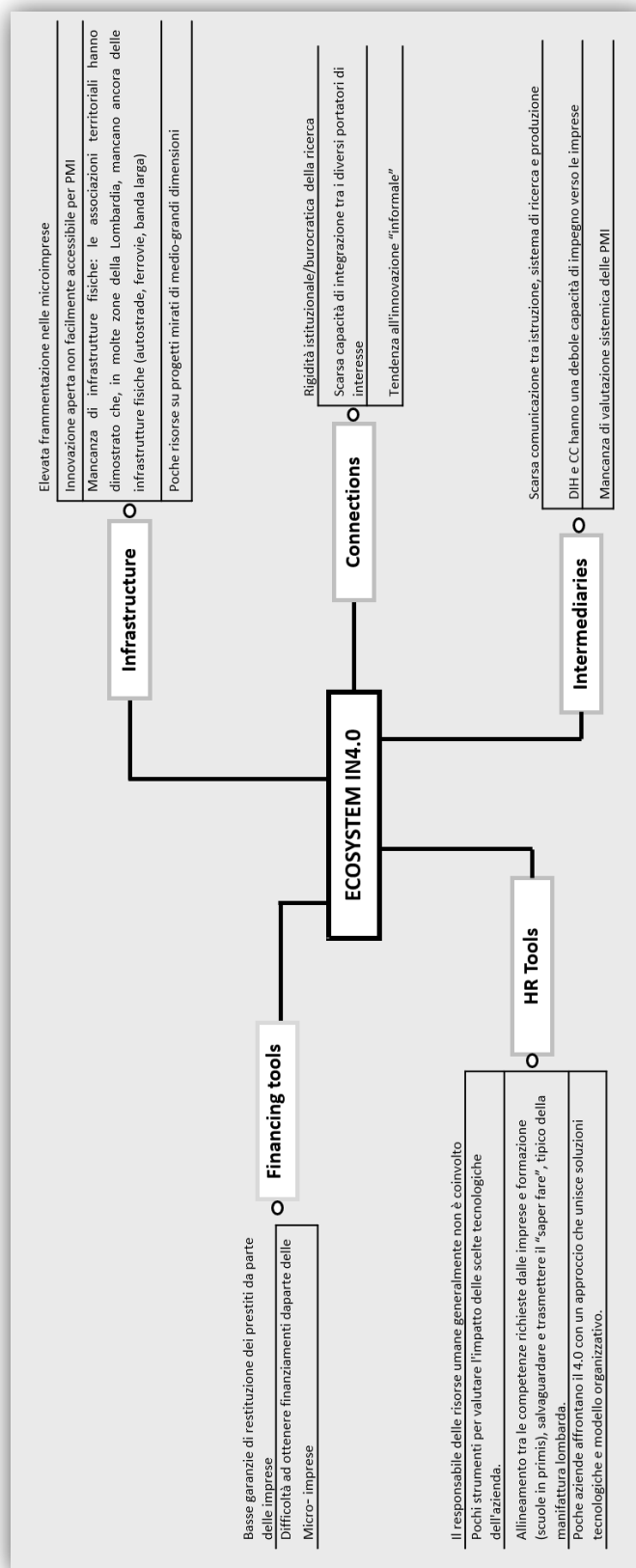
Analisi Swot ECOS4IN – “Punti di forza” Regione Lombardia



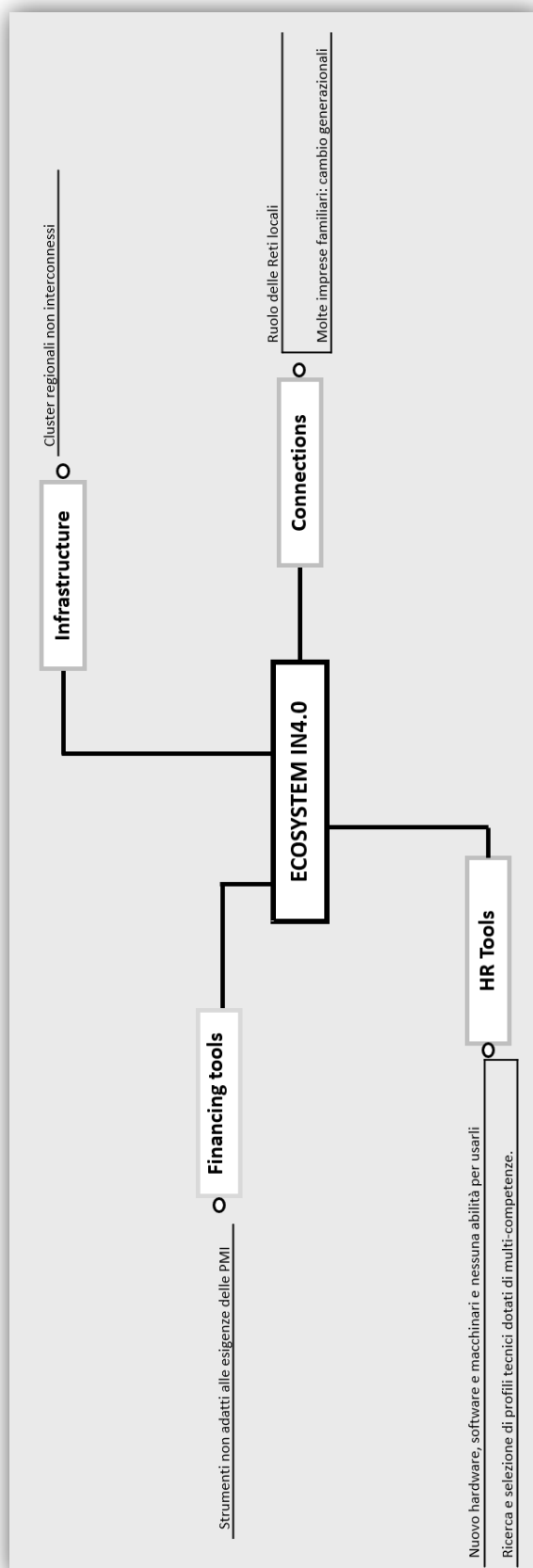
Analisi Swot ECOS4IN – “Opportunità” Regione Lombardia



Analisi Swot ECOS4IN – “Punti di debolezza” Regione Lombardia



Analisi Swot ECOS4IN – “Minacce” Regione Lombardia



2.2 IL PROGETTO PILOTA HUMAN CAPITAL HUB ECOS4IN

Avendo come obiettivo quello di progettare e implementare un punto di accesso unico per l'Industria 4.0 e la fabbricazione digitale, la Fondazione Brodolini, ha lanciato nel novembre 2020 il progetto *Human Capital Hub ECOS4IN*, fortemente focalizzato sul settore *food & hospitality* e in grado di coinvolgere contemporaneamente un campione del tessuto imprenditoriale e delle nuove generazioni.

Tra le varie azioni previste del progetto pilota, conclusosi nel settembre 2021, vi è stata la realizzazione di un InfoHub 4.0 (Hub di Milano Luiss): una cornice dove hanno avuto luogo programmi di sviluppo delle capacità, eventi ed attività di networking. In altri termini, uno spazio fisico il cui scopo è stato quello di creare sinergie, contaminazione di innovazioni e anche sperimentazione di realtà virtuali.

L'InfoHub in questi mesi ha svolto il duplice compito di fornire un programma di acquisizione di nuove *skill* per le PMI sull'industria 4.0 e la rivoluzione digitale ed implementare soluzioni in grado di risolvere le sfide tecnologiche che le piccole medie imprese si trovano ad affrontare nella quarta rivoluzione industriale.

Il progetto ha voluto così fornire uno spazio in cui la conoscenza e le competenze relative a Industria 4.0, rivoluzione digitale e nuove tecnologie potessero essere facilmente trasferite a due attori essenziali della società: PMI e studenti.

Il pilota è riuscito non solo a raggiungere i suoi obiettivi, coinvolgendo complessivamente quasi 300 persone tra PMI, studenti e cittadini, nelle attività del programma, ma ha anche generato diversi processi di *co-design* e *open innovation*, rafforzando una rete di esperti, aziende e persone curiose intorno al tema dell'Industria 4.0 e promuovendo opportunità trasversali rivolte all'ecosistema cittadino.

2.2.1 Selezione PMI, attività e studenti

Il coinvolgimento delle PMI è stato realizzato all'interno di un programma articolato in tre fasi: la prima dedicata alla formazione; la seconda focalizzata sulla valutazione delle competenze; e infine, l'ultima, ha previsto una serie di attività di *co-design* in cui le imprese hanno lavorato insieme a studenti nella progettazione e realizzazione di soluzioni.

Tra ottobre e novembre 2020 è stato ideato e lanciato un bando per raccogliere e selezionare le candidature delle PMI operanti nel settore *food & hospitality*. Il bando promosso attraverso i canali di Fondazione Brodolini e del Milano Luiss Hub ha visto la candidatura di 10 attori economici tra PMI e *Startup*.

Le aziende selezionate per la partecipazione alla sperimentazione sono state:

- *Turismiamo*: startup, che offre soluzioni innovative per il turismo utilizzando la realtà aumentata;
- *Frieco*: società benefit che opera nel settore recycling e che ha brevettato un nuovo dispositivo altamente tecnologico in grado di ridurre la quantità di rifiuti differenziati;
- *Eatour*: startup che mira a premiare le filiere produttive sostenibili, facilitare le opportunità di business per le aziende che lavorano con la CSR e aumentare la consapevolezza sui cambiamenti climatici e lo sviluppo sostenibile;
- *KrillDesign*: startup dedicata all'economia circolare;

- *Decor Design*: opera nel settore home & design e presta particolare attenzione al design sostenibile;
- *Hotel Bonotto*: piccola catena alberghiera che negli ultimi anni ha apportato importanti innovazioni tecnologiche nella gestione ordinaria.

Nelle prime fasi è stato erogato un percorso formativo altamente specializzante, destinato alle imprese selezionate e che hanno coinvolto: under 30, facilitatori ed esperti.

Parallelamente si è proceduto con la somministrazione di un *assessment* aziendale, volto a misurare lo stato di digitalizzazione interna e la valutazione delle competenze trasversali.

Inoltre, sono stati progettati e realizzati cinque *webinar* dedicati a PMI e *community* che hanno affrontato diversi temi legati all'industria 4.0 e che hanno coinvolto diversi *stakeholder* del panorama *food&hospitality*.

Nel marzo 2021, le PMI hanno iniziato a lavorare insieme su attività di co-progettazione con studenti o neolaureati. Ogni impresa è stata abbinata con uno degli studenti selezionati attraverso un'*open call*, e sono state attivate attività di co-design con l'obiettivo di progettare e sviluppare soluzioni che potessero risolvere i bisogni precedentemente individuati dall'*assessment* fatto alle imprese e startup.

Tra marzo e aprile 2021 sono state tenute 5 lezioni su Industria 4.0, digitalizzazione e nuove tecnologie e a marzo gli studenti sono stati abbinati alle PMI per iniziare a co-progettare soluzioni innovative in grado di rispondere alle esigenze delle PMI.

Gli studenti, oltre a esser coinvolti durante la fase di brainstorming e implementazione delle soluzioni, hanno lavorato ciascuno con una PMI supportati con sessioni *One to One* di *training* e *mentoring*.

Nel maggio 2021, essi hanno pianificato e organizzato un webinar relativo all'istruzione e all'Industria 4.0 invitando al dibattito 2 relatori esterni (Francesco Bolici e Francesco Ferrante entrambi docenti presso l'Università degli studi di Cassino e del Lazio Meridionale) ed oltre 90 persone hanno partecipato al webinar: "*Human Capital Hub ECOS4IN | Il capitale umano tra 4.0 e umanesimo*".

Tra maggio e settembre 2021, gli attori si sono concentrati completamente sull'ulteriore implementazione delle soluzioni: ogni studente ha avuto responsabilità e compiti specifici nel piano di progetto nonché influenza decisionale in sede di planning e strategia.

2.2.2 Digital Community: Hackability

Anche la comunità di *digital maker* e *stakeholders* dell'Industria 4.0 milanese è stata coinvolta nell'implementazione di alcune *key activities*, raggiungendo un pubblico più ampio.

In primo luogo, tra febbraio e marzo 2021 il Milano Luiss Hub for Makers and Students è stato arredato per ospitare attività del pilota.

Inoltre, tra novembre 2020 e maggio 2021 sono stati progettati e svolti 7 webinar online rivolti specificamente alla comunità e affrontando diversi argomenti, come il turismo e l'industria 4.0, il design thinking e l'impatto della digitalizzazione.

Infine, tra maggio 2021 e giugno 2021 è stato lanciato un tavolo di co-design con l'associazione Hackability, il cui scopo è sviluppare soluzioni innovative attraverso strumenti di digital fabrication che possono aiutare a risolvere le sfide quotidiane che le persone con disabilità incontrano.

Obiettivo del tavolo è stato quello di implementare soluzioni adattabili che potessero facilitare l'utilizzo di spazi chiusi, quali musei e camere di albergo, tenendo in considerazione le esigenze aziendali insieme a quelle personali con le persone affette da disabilità visiva.

Outcome del tavolo è stata la prototipazione di “*Sherlock*”, un dispositivo fisico e digitale, in grado di fare le veci di un ‘*conciierge*’, e abilitare le descrizioni in file audio utili per capire perfettamente come si articola lo spazio di accoglienza (stanza d’albergo, caratteristiche della struttura di accoglienze, informazione, ecc.).

2.2.3 Unboxing Complexity: Evento finale

La giornata conclusiva dell’Interreg ECOS4In ha avuto luogo il 27 ottobre 2021 con un evento finale nell’Hub di Milano Luiss, in cui i partecipanti hanno presentato i risultati suggerendo buone pratiche a favore dell’ecosistema locale. L’evento ha coinvolto gli attori che stanno lavorando per rafforzare competenze e alleanze utili per affrontare processi complessi di trasformazione dei sistemi economici e sociali, nonché occasione per la condivisione di conoscenze acquisite ed esperienze durante il progetto. Il pomeriggio è stato suddiviso in dibattiti, discussioni e presentazioni circa diverse (seppur interconnesse) tematiche: dal Turismo&Industria4.0 alla Transizione Ecologica, il rapporto tra uomo e tecnologia, all’aiuto che i giovani possono dare ad imprese ed aziende fornendo una prospettiva diversa, fresca, innovativa affinché possano abbracciare meglio i benefici derivanti dal cambiamento.

L’evento è stato anche occasione per il lancio del Laboratorio delle Neuroscienze: allestito negli spazi del *Metafablab*, il laboratorio curato dal neuroscienziato e psicologo Andrea Bariselli (fondatore della *tech-company* Strobilo che dirigerà il laboratorio), è nato con l'intento di avviare nuove forme di sperimentazione scientifica e sociale, a partire da un'esigenza che riconosce come fondamentale: quella di educare e aiutare tutte le persone alla consapevolezza del valore ambientale, tale per cui gli investimenti delle pubbliche amministrazioni possano essere compresi, incoraggiati e sostenuti.

Una popolazione in grado di riconoscere i benefici che derivano dal contatto con gli elementi naturali anche all’interno delle grandi città, infatti, è una popolazione che abbraccia il tema della prevenzione della salute, propria e della città in cui vive.

Attraverso il monitoraggio costante di un’ampia gamma di parametri ambientali, il Laboratorio può quindi sostenere gli investimenti e le decisioni strategiche di sviluppo urbano, ottimizzare le risorse, creare contenuti a scopo educativo, misurare l’impatto ambientale e migliorare i processi fornendo correlazioni altamente predittive con precisione ed efficienza, qualificandosi gradualmente come uno strumento attivo al servizio delle città, a partire da quella di Milano, e facendo da ponte tra ricerca e istituzioni, tra il mondo dell’industria e le questioni ambientale e climatica.

2.3 VALUTAZIONE, COSA MANCA E COSA È NECESSARIO SVILUPPARE

Secondo l'Istat (il sistema statistico nazionale) dai dati degli incentivi fiscali dedicati all'Industria 4.0 emerge come l'impatto abbia riguardato prevalentemente le grandi aziende (96,7%), mentre modesto è stato il coinvolgimento delle imprese con meno di 50 dipendenti (appena il 40%). Eppure i processi di trasformazione della quarta rivoluzione industriale mettono seriamente in discussione paradigmi consolidati e pratiche storiche, quindi è necessario che siano accompagnati dall'introduzione di strumenti di innovazione tecnologica che consentano di far progredire le competenze dei lavoratori nelle imprese, in particolare quelle di piccole e medie dimensioni (PMI).

Le piccole medie imprese rappresentano la parte sostanziale della base industriale e terziaria lombarda, ma spesso non hanno le risorse relazionali, umane e/o tecniche per aderire alle reti di innovazione tecnologica come nel caso delle grandi aziende coinvolte in agglomerati di innovazione tecnologica (DIH, CC, Parchi Scientifici e Tecnologici, Tecnopoli, ecc.). Un ulteriore aspetto da prendere in seria considerazione ha a che fare con quanto emerge dal riflessione di studiosi e professionisti sullo "sviluppo aziendale" del modello Industria 4.0. Di fatto, molti insistono sul fatto che il passaggio al digitale attraverso l'introduzione dell'abilitazione le tecnologie devono essere precedute - sia dal punto di vista logico che di fatto - da un ridisegno delle imprese in termini di organizzazione aziendale, la trasformazione dei modelli organizzativi richiede un analogo riequilibrio della cultura professionale in base ai diversi ruoli e funzioni.

Le PMI si trovano quindi di fronte a maggiori difficoltà con i nuovi cambiamenti tecnologici e digitali, che devono essere accompagnate da strategie efficaci sul versante della formazione, al fine di aumentare le competenze dei candidati e lavoratori. Tale difficoltà è strettamente connessa alle difficoltà di sviluppo del sistema ITS in Lombardia (e in tutta Italia) che fanno innanzitutto riferimento alle criticità del meccanismo di finanziamento basato su bandi annuali e su rigidi vincoli riguardanti le voci di spesa¹⁵.

Un meccanismo che impedisce al sistema di rafforzarsi, di gestire attraverso una programmazione pluriennale la propria offerta formativa e che ne limita quindi anche l'attrattività, perché più difficilmente comunicabile e basata su quanto viene approvato di anno in anno.

In tal senso, le strette finestre temporali tra l'uscita dei bandi e l'avvio dei percorsi non sempre permettono un'accurata selezione dei giovani candidati, generando così di conseguenza significative percentuali di abbandono oltre che ulteriori difficoltà di promozione e diffusione di attività di orientamento presso le scuole secondarie superiori.

Alcune Fondazioni ITS hanno poi sottolineato la non sempre semplice reperibilità di docenti in grado di formare le competenze oggetto del percorso ITS: non basta, infatti, che un lavoratore posseda un determinato insieme di conoscenze, è necessario anche che sappia comunicarle agli studenti, in una relazione che è pur sempre una relazione educativa, e non esclusivamente formativa.

L'adozione del paradigma di Industria 4.0 non può prescindere da adeguati investimenti nel capitale umano: senza competenze, le tecnologie non possono essere implementate, migliorate, ulteriormente innovate: gli ITS sono quindi gli alleati naturali delle imprese nella promozione di percorsi di formazione in grado di fornire ai giovani competenze abilitanti le trasformazioni del lavoro.

Uno strumento ancora poco diffuso che potrebbe moltiplicare l'efficacia e i benefici degli ITS connessi a Industria 4.0 è l'apprendistato di alta formazione e ricerca. Attraverso di esso le aziende potrebbero già

¹⁵ Adapt, 2021, *Gli ITS lombardi e il Piano di Sviluppo nazionale Industria 4.0*, Confindustria Lombardia.

assumere gli studenti partecipando ancora più attivamente sia alla costruzione del percorso, sia alla loro formazione in azienda, a diretto contatto con le tecnologie implementate: inoltre, verrebbe rafforzata tutta quella parte di competenze trasversali che compongono l'offerta formativa di questi corsi. Non solo: utilizzandolo anche a seguito del conseguimento del diploma, per lo svolgimento di attività di ricerca, potrebbe prolungare il rapporto tra imprese e ITS e favorire lo sviluppo di ulteriori collaborazioni, più improntate alla ricerca, allo sviluppo, al trasferimento tecnologico.

Inoltre, una logica ecosistemica potrebbe poi favorire l'ulteriore collegamento tra gli ITS e le associazioni professionali che erogano certificazioni che hanno un alto valore sul mercato del lavoro: si potrebbero cioè prevedere specifici accordi, che solo in parte già esistono, per il riconoscimento del sistema ITS come percorso utile per maturare le competenze per ottenere poi una certificazione specifica.

Un ulteriore processo che gli ITS come piattaforme per lo sviluppo e l'innovazione possono sviluppare è quello della formazione continua dei lavoratori, anche utilizzando le proprie strutture formative e soprattutto i laboratori che, nell'ottica di una ristrutturazione della governance e dei meccanismi di finanziamento, ogni Fondazione ITS avrà a disposizione e che realizzerà anche grazie all'apporto delle aziende partner

Accanto alla tematica di transizione e acquisizioni di nuove competenze, una seconda proposta riguarda la realizzazione di una piattaforma di innovazione (fisica e virtuale), all'interno della logica di *Open Innovation*, dove gli attori possono incontrarsi ed essere supportati nell'avvio di una cooperazione oppure nell'elaborare in modo collaborativo nuove idee e condividere le conoscenze per rendere questa idea una realtà. La piattaforma offrirà servizi per raccogliere, condividere e commentare idee, per identificare le aziende e *makerspace* con competenze complementari per creare *partnership* mirate ed innovative, per scambiare informazioni su idee e/o metodi di produzione e fare valutazioni sul fattibilità e sostenibilità di nuove idee.

Al suo interno si potrebbe creare anche un *Toolkit* composto da: processi collaborativi, asset disponibili che spieghino ai produttori come modificare l'organizzazione interna; metodologie di innovazione elaborate con il supporto di esperti e guide per co-creazione e co-progettazione di idee, nuovi modelli di business per prodotti innovativi.

Riassumendo, gli obiettivi da porsi sono:

1. ridurre (e in prospettiva colmare) il divario di competenze tra le esigenze delle imprese rispetto a i processi di digitalizzazione e Impresa 4.0 e i profili in uscita dalla scuola e dall'università sistema
2. inserire nel sistema formativo delle competenze superiori la capacità di adattamento e aggiornamento del sistema di offerta
3. incoraggiare e rafforzare il livello di istruzione superiore tecnica alternativa post-diploma rispetto al canale universitario, come snodo fondamentale tra formazione e bisogni di medio-piccole imprese ad alta tradizione manifatturiera
4. creare una cultura diffusa, fin dalla scuola primaria, favorevole all'innovazione e la digitalizzazione come opportunità di crescita personale e sociale in modo sostenibile e coeso prospettiva.

Action plan for Industry 4.0 implementation into regional innovation strategy in partner area Lombardia

THE ECOS4IN PROJECT

1. INTRODUCTION

Info ECOS4IN

The 4.0 transformation processes are seriously challenging established paradigms and practices for Lombardy's companies, especially small and medium-sized enterprises, which are a fundamental component of the industrial and tertiary fabric of the Lombardy Region.

Very often, Lombardy's SMEs do not have the relational, human and/or technical resources to become part of international innovation ecosystems. This lack translates above all into greater difficulty in identifying the skills and knowledge needed to implement vocational training courses, with a view to enhancing and creating professional figures that meet the needs of businesses.

The international ECOS4IN (International Ecosystem for Industry 4.0) project was developed to meet this need. Through transnational cooperation of actors involved in smart specialisation strategies (RIS3) and Industry 4.0 implementation processes, it chooses to strengthen the innovation capacities of the regions, to make the local business fabric ready for the challenges of tomorrow. Implementation of the project started in April 2019 and will be completed in March 2022.

The phases of the ECOS4IN project are:

1. a preliminary analysis of the current implementation of Industry 4.0 in the Lombardy context;
2. construction of a general model of the knowledge ecosystem;
3. development of an action plan dedicated to the specialisation strategies of the Lombardy Region.

The first step by all seven partners involved was to build a general ecosystem model, considered for each individual context, through SWOT¹ and GAP² analyses, to understand the state of the context of reference.

¹ The SWOT (*Strengths, Weaknesses, Opportunities and Threats*) analysis/matrix is a 2x2 matrix in which internal and external factors that have a potential impact, positive or negative, on the business or activity to be carried out are appropriately identified and organised. Calicchio, 2017, *The swot analysis in 4 steps*, Kobo E.book.

² A *gap analysis* is a formal study of what an organisation is currently doing, where it wants to go and how it is possible to bridge the gap between these two. This analysis can be conducted from various perspectives and, consequently, there are different types of methodologies to carry it out.

In order to achieve the project's objectives, alongside the analyses, each partner designed and implemented a pilot project. Specifically, Fondazione Brodolini designed the implementation of the *Human Capital Hub ECOS4IN*, a physical and digital platform, focused on the food & hospitality sector, which involved a sample of SMEs, belonging to the reference area, and students/under 30s.

The purpose of this document is to define the action plan for the region Lombardy

At the start of the ECOS4IN Project, no one could have predicted the worst recession (known as the "*Great Lockdown*") since the *Wall Street Crash* of 1930, the third (possibly worst) economic, financial and social *shock* of the 21st century, after the attacks of 11 September 2001 and the financial crisis of 2008³. The harsh picture of 2020 has given way, in 2021, to a recovery, or rather what is technically called a 'positive rebound'. Lombardy's industrial production in the third quarter of 2021 grew by +2.5% (+12% compared to 2020). The employment rate in the Lombardy Region has reached almost 67% with a positive balance between new contracts and terminations⁴, companies estimate⁵ that in the next few years 30% of the workforce will be difficult to source due to the lack of skills of the candidates. This *mismatch* of skills is much higher among the Under 30s (the average difficulty of finding skilled workers and specialists in computer science is over 55%), a paradox if we consider that the youth unemployment rate in Lombardy is about 20% (against 17% of the EU average).

The general context is reflected in the priorities of the regional policies, which are, on the one hand, to support SMEs in their process of innovation and acquisition of 4.0 technologies, also through a redesign of the business organisation and, on the other hand, to equip the educational system in terms of training and skills related to advanced technologies, a point that is currently considered a limitation of the training system and a source of concern by the Lombardy robotics industry.

The ECOS4IN project, whose aim is to improve the implementation of the fourth industrial revolution in the Lombardy Region, is part of this process, which is constantly changing the

³ Economics Section, 2020, *For OECD the impact of the coronavirus on the economy already exceeds worst predictions*, 2020, AGI.

⁴ Outflows still reduced compared to pre-pandemic values also due to the effect of the so-called "freeze" on redundancies and the intensive use of the Cassa integrazione. Unioncamere, 2021, *The labour market in Lombardy 1st quarter 2021*.

⁵ Unioncamere, 2021, *EXCELSIOR Informs the employment programmes of companies surveyed by the Chamber of Commerce system*.

production sector. Starting from an accurate analysis of the Lombardy economic context, a tool called "*ECOS4IN Knowledge Base*" was created. This tool was the basis of the *Human Capital Hub* pilot project, which was also the validation test. The pilot project was created to provide a small target group (SMEs and the younger generations) with the necessary knowledge to increase their awareness of Industry 4.0.

Objectives Action Plan

The aim was to build an action programme capable of promoting specific "activities/conditions" to deal with the post-emergency situation, starting from the priority aspects of the "new world" in which businesses, operators, stakeholders and citizens find themselves living their new everyday life redefined on innovation, sustainability and the enhancement of human capital and knowledge.

In this direction the pilot project was launched in the Info Hub 4.0, at the *Milano Luiss Hub*, a single access point for Industry 4.0 and digital manufacturing aimed at facilitating the creation of new synergies between SMEs, community and students through cross-discipline activities, events and webinars. The design of an InfoHub 4.0 responded to two key concepts, "sustainability", i.e. the project had to coherently incorporate and accompany the provisions of the regional strategies of intelligent specialisation (RIS3)⁶, and "transferability", i.e. the Human Capital Hub ECOS4IN had to focus on the direct and practical needs of the economic and political fabric of Lombardy, seeking to create a sort of "instruction booklet" for the Region itself, aimed at achieving the objectives set out below.

Summary of Macro-objectives

- Increasing the implementation capacity of innovative projects by SMEs
- Developing new 4.0 skills

Analysis of the framework (ecosystem model for I4.0, SWOT & GAP)

The process of analysis of the territorial context sees the realization of an important step on 30 September 2019, when the regional referents of Lombardy, operating in the field of higher education,

⁶ For more information see: *National or regional innovation strategies for smart specialisation (RIS3)*. Available document: https://ec.europa.eu/regional_policy/sources/docgener/informat/2014/smart_specialisation_it.pdf

were invited to the first meeting of the regional stakeholder group⁷ at the infoHub4.0. The main objective of the meeting was to identify competences for Industry 4.0.

In the light of the information that emerged, it was possible to develop a SWOT (*Strengths, Weaknesses, Opportunities and Threats*) matrix for the Lombardy context of the IN4.0 general ecosystem model.

It thus emerges that the modified model of the regional knowledge ecosystem for Industry 4.0 aims at improving the know-how required for the development and use of Industry 4.0 technologies.

Within a very heterogeneous European framework, consisting of developed regions with well-performing innovation systems, characterised by strong links between its actors, as well as mostly rural and peripheral regions characterised by a low level of research and weak links within the innovation system, Lombardy is located within an intermediate band between these two opposites.

The strengths of the Lombardy Region are many: it is the most economically productive region in Italy, it already has a significant number of stakeholders relating to Industry 4.0 and as mentioned earlier, the Lombardy legislature has already launched a process to support small and medium-sized enterprises in their efforts to move towards the fourth industrial revolution. Among the opportunities, the possibility of attracting international investment and greater collaboration with the school system, aimed first and foremost at strengthening higher technical institutes, are highlighted. This development could in turn foster the emergence and consolidation of new skills and new professional figures capable of improving the competitiveness of Lombardy's small and medium-sized enterprises.

As regards the weaknesses, discussed in more detail in the next section, there is certainly a high level of fragmentation of micro (nano) enterprises in Lombardy, which are unable to access innovation frequently and easily, especially in urban areas. In addition, it is very difficult for businesses to access credit, as they often lack adequate guarantees. It is therefore clear that, as a priority, in order to foster the development of a regional knowledge ecosystem for Industry 4.0, it is necessary to work on the *mismatch of skills* between what is required by businesses and what the school education system is currently able to offer. It is therefore necessary to safeguard and transmit the 'know-how' typical of Lombard manufacturing.

Pilot Project

With the aim of designing and implementing a single access point for Industry 4.0 and digital manufacturing, the pilot Human Capital Hub ECOS4IN, , focusing on the food & hospitality sector

⁷ These include: TheFabLab, Junior Achievement Italia, Luiss University, FabriQ, Afol Metropolitana, In-Sprint, Consulting Agencies.

and involving various stakeholders from the Industry 4.0 ecosystem, was launched in November 2020.

The pilot project started its implementation phase in November 2020 and ended in September 2021 with the aim of providing a space where knowledge and skills related to Industry 4.0, the digital revolution and new technologies could be easily transferred to two essential actors in society: SMEs and students.

The pilot involved a total of almost 300 people, including SMEs, students and citizens, in the activities of the programme and, at the same time, it also generated several co-design and open innovation processes, strengthening a network of experts, companies and people curious about Industry 4.0 and promoting cross cutting opportunities aimed at the city ecosystem.

The involvement of SMEs was carried out in a three-phase programme: the first phase was dedicated to training; the second focused on skills assessment; and finally, the last phase involved a series of co-design activities in which companies worked together with students in the design and implementation of solutions.

The first step involved the creation of a call for applications to collect and select candidatures from SMEs operating in the food & hospitality sector. The call for applications, promoted through the channels of Fondazione Brodolini and the Milano Luiss Hub, saw the candidature of 10 economic actors, including SMEs and startups.

The companies selected to participate in the trial were:

- Turismiamo: a start-up offering innovative solutions for tourism using augmented reality;
- Frieco: a benefit company operating in the recycling sector that has patented a new high-tech device capable of reducing the amount of sorted waste;
- Eatour: a start-up that aims to reward sustainable production chains, facilitate business opportunities for companies working with CSR and raise awareness on climate change and sustainable development;
- KrillDesign: a start-up dedicated to circular economy;
- Decor Design: a start-up operating in the home & design sector with particular attention to sustainable design;
- Hotel Bonotto: a small hotel chain which in recent years has introduced important technological innovations in its day-to-day management.

A highly specialised training course was then delivered to the selected companies, involving: under 30s, facilitators and experts. At the same time, a company assessment was carried out to measure the state of internal digitisation and the assessment of cross cutting skills. In addition, five webinars dedicated to SMEs and the community, addressing various topics related to Industry 4.0 and involving various stakeholders from the food and hospitality sector, were designed and held.

In March 2021, SMEs started working together on co-design activities with students or recent graduates. Each company was paired with one of the students selected through an open call, and co-design activities were activated with the aim of designing and developing solutions that could solve the needs previously identified during assessment of the companies and startups.

At the same time, the following were organised: several meetings with stakeholders; 5 lectures on Industry 4.0, digitisation and new technologies; the webinar "Human Capital Hub ECOS4IN | Human capital between 4.0 and humanism", related to education and Industry 4.0; 7 online webinars specifically directed at the community and addressing different topics, such as tourism and industry 4.0, design thinking and the impact of digitisation.

Finally, a co-design panel was launched with the Hackability association, whose aim is to develop innovative solutions through digital fabrication tools that can help solve the daily challenges faced by people with disabilities. The aim of the panel was to implement adaptable solutions able to facilitate the use of closed spaces, such as museums and hotel rooms, taking into account the business needs as well as the personal needs of people with visual disabilities. The outcome of the panel was the prototyping of "Sherlock", a physical and digital device, able to act as 'concierge', and enable descriptions in audio files useful to understand perfectly how the reception space is structured (hotel room, characteristics of the reception structure, information, etc.).

2 Background for the regional action plan (rationality for the activities)

The overall view on the ecosystem in the particular EC region

In this context of profound technological and digital change, a number of policies have followed one another in Italy in recent years, prompted in part by what was happening at European level, and aimed at promoting and incentivising the transition of the national business fabric to the 4.0 paradigm.

Lombardy was the first Italian region to decide to address the issue of the fourth industrial revolution, regulating it through a law approved on 10 April 2015 entitled *Manufacturing 4.0*, based on the prerogatives entrusted to it by Article 117 of the Constitution.

In 2020, the Italian government approved the 'Punto Impresa Digitale' (PID) (Digital Enterprise Point) project, as part of the activities envisaged in the Transition 4.0 Plan, the aim of which is to:

- promote the use by Lombardy's SMEs of services or solutions focused on new digital skills and technologies in implementation of the strategy defined in the Transition 4.0 Plan;

- promote digitisation and automation measures to ensure business continuity during the Covid-19 health emergency and post-emergency restart;
- encourage green production development models oriented towards quality and sustainability through products/services with lower environmental and social impacts.

These measures, also included in the National Recovery and Resilience Plan (PNRR), are in line with the guidelines already launched in Lombardy and have already made it possible to deploy resources to support the regional economic system. Among the most innovative elements adopted by the Lombardy legislature, it is worth mentioning:

- the implementation of the third edition of the call for proposals 'Development of innovative Enterprise 4.0 solutions' to support projects that are readily implementable and of potential market interest, with a focus on digital solutions with a view to sustainability.
- The "I4.0 Digital Vouchers" call for proposals, which aims to meet the innovation needs of Lombardy's SMEs through the digitalisation of processes, products and services. Projects must concern 4.0 digital innovation technologies.

Lastly, the 'Testimone' (Witness) project, a pilot project launched by the Lombardy Region to support local businesses involved in generational changeover or business transfer processes. Business continuity within and outside the family structure is one of the most delicate problems in the life cycle of Lombardy's MSMEs. The project, which is divided into three phases, aims to identify structural, diversified and replicable methods of intervention on the subject of generational changeover, starting from concrete cases. The third phase of the project, which brings together the results of the first two phases, is the systemisation of regional tools and those of the Chamber of Commerce system aimed at encouraging the transfer of business and the generational changeover in Lombardy's MSMEs.

Evaluation, what is missing and what must be developed

Small and medium-sized enterprises make up a substantial part of Lombardy's industrial and tertiary base, but they often lack the resources and skills to join technological innovation networks as large companies involved in technological innovation clusters (Science and Technology Parks, Technopoles, etc.) are able to do. A further aspect to be taken into serious consideration is the greater difficulty SMEs have in dealing with new technological and digital changes, which must be accompanied by effective strategies on the training front in order to increase the skills of candidates and workers.

Focusing on what has emerged from the analysis carried out, from comparison with the various stakeholders and from the state of the Lombardy entrepreneurial fabric, the focal points to be developed can be summarised in these two macro-areas:

1. increasing the reporting and implementation capacity of SMEs in the field of innovation;
2. developing and enhancing new 4.0 skills.

With regard to the first point, we consider repetition of what was implemented during the pilot project, which allowed companies not only to analyse themselves in a 4.0 perspective, but also to create relationships and processes capable of developing an implementation path of fundamental development for growth and change towards a 4.0 paradigm, to be very important. A second theme to be developed with a view to the future concerns the creation of an innovation platform (physical and virtual), within the logic of Open Innovation⁸, where actors can meet and collaboratively develop new ideas and share knowledge. The platform will offer services to collect, share and comment on ideas, to identify companies and makerspaces with complementary competences to create targeted and innovative partnerships, to exchange information on ideas and/or production methods and to make assessments on the feasibility and sustainability of new ideas.

This could include a toolkit consisting of: collaborative processes, available assets that explain to producers how to change their internal organisation; innovation methodologies developed with the support of experts and guides for co-creation and co-design of ideas, new business models for innovative products.

Linked to the second point, the difficulty of finding and enhancing the skills needed for change and development in businesses must be addressed. The adoption of the Industry 4.0 paradigm cannot disregard adequate investment in human capital: without skills, technologies cannot be implemented, improved or further innovated: ITS (Higher Technical Institutes) are therefore the natural allies of businesses in promoting training courses that can provide young people with skills that will enable the transformation of work.

There is, however, a major difficulty in developing the highly specialised technical and scientific system (ITS) in Lombardy (and throughout Italy), the main instrument for transmitting these skills, which is primarily due to the critical nature of the funding mechanism based on annual calls for proposals and strict constraints on expenditure items⁹.

⁸ Open Innovation (OI) is a concept that has been widely discussed and promoted in the manufacturing sector for decades. The term 'open' refers to the 'research and development' functions of companies, transforming them into an open and shared system in which the sources of new knowledge are both inside and outside the organisation. A perfect example of this knowledge-sharing process comes from fab labs (fabrication laboratories), makerspaces and hackerspaces.

⁹ Adapt, 2021, *Gli ITS lombardi e il Piano di Sviluppo nazionale Industria 4.0*, Confindustria Lombardia.

Some ITS foundations have also underlined the fact that it is not always easy to find teachers able to train the skills covered by the most innovative courses. It is not enough for a worker to possess a certain body of knowledge, but he or she must also be able to communicate it to students, in a relationship that is still an educational and not solely a training relationship.

For this reason, our intention was to strengthen the relational network, between regional representatives, enterprises and stakeholders, formed and consolidated during all the meetings and discussions held during the project, capable of engaging in a concrete dialogue, with the support of FGB, for the definition of new development methods, both thematic and implementation, of ITS.

3. Description of the activities

Name of activity	Description	Timeline/Duration	Resources (financial)*	Stakeholders
Mapping	Ecosystem analysis on defined clusters in order to detect the existing situation in terms of technological and economic development.	2 months	20,000	trade associations, study centres, DIH (Digital Innovation Hub), universities
Assessment 4.0 SMEs	Administration of a self-assessment questionnaire; company assessment with a 4.0 expert on the use of technology; assessment of soft-hard skills 4.0 SMEs; identification of areas for improvement.	6 months	13,000	SMEs, fab labs, 4.0 experts
Platform	Activation of physical-virtual platform for training, mentoring and peer-to-peer activities on 4.0.	4 months	10,000	SMEs, makers, experts, university students
Capacity Building	4.0 skills training course for company PMs and university students	4 months	14,000	fab labs, enterprises, universities, InfoHubs

Co-design	Workshops and one to one between SMEs, fab labs, sector stakeholders and students	2-3 months	8,000	SMEs, fab labs, 4.0 experts
Pretotyping	Using digital fabrication labs of info hubs for pretotyping	2 months	7,000	SMEs, fab labs.
Community Engagement	Simulation activities, dissemination events, webinars and workshops	10 months	8,500	cities, makers, students, public administrations, DIH (Digital Innovation Hub), trade associations
4.0 and inclusiveness, co-design and pretotyping	Construction of a methodology for small and medium-sized enterprises to adopt the disability perspective in digital transformation processes.	4 months	15,000	disabled people, fab labs, enterprises

- Costs were estimated on the basis of expenses incurred within the pilot project.

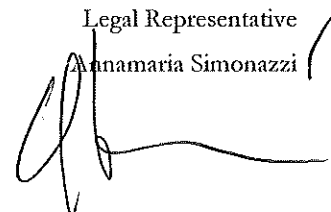
The cost estimate does not include management and administration costs, which vary according to the organisation adopting the Action Plan.

4. Declaration of intent

On behalf of Fondazione Giacomo Brodolini, the undersigned hereby declares that this Action Plan designed in the frame of the ECOS4IN project for implementation of I4.0 in Lombardia will be considered in the designing and implementation of the innovation methodologies and strategies in the forthcoming years.

22/3/2022

Legal Representative
Annamaria Simonazzi



Action plan for Industry 4.0 implementation into regional innovation strategy
in partner area Lombardia

22208 ml
6.4.2022

THE ECOS4IN PROJECT

1. INTRODUCTION

Info ECOS4IN

The 4.0 transformation processes are seriously challenging established paradigms and practices for Lombardy's companies, especially small and medium-sized enterprises, which are a fundamental component of the industrial and tertiary fabric of the Lombardy Region.

Very often, Lombardy's SMEs do not have the relational, human and/or technical resources to become part of international innovation ecosystems. This lack translates above all into greater difficulty in identifying the skills and knowledge needed to implement vocational training courses, with a view to enhancing and creating professional figures that meet the needs of businesses.

The international ECOS4IN (International Ecosystem for Industry 4.0) project was developed to meet this need. Through transnational cooperation of actors involved in smart specialisation strategies (RIS3) and Industry 4.0 implementation processes, it chooses to strengthen the innovation capacities of the regions, to make the local business fabric ready for the challenges of tomorrow. Implementation of the project started in April 2019 and will be completed in March 2022.

The phases of the ECOS4IN project are:

1. a preliminary analysis of the current implementation of Industry 4.0 in the Lombardy context;
2. construction of a general model of the knowledge ecosystem;
3. development of an action plan dedicated to the specialisation strategies of the Lombardy Region.

The first step by all seven partners involved was to build a general ecosystem model, considered for each individual context, through SWOT¹ and GAP² analyses, to understand the state of the context of reference.

¹ The SWOT (*Strengths, Weaknesses, Opportunities and Threats*) analysis/matrix is a 2x2 matrix in which internal and external factors that have a potential impact, positive or negative, on the business or activity to be carried out are appropriately identified and organised. Calicchio, 2017, *The swot analysis in 4 steps*, Kobo E.book.

² A *gap analysis* is a formal study of what an organisation is currently doing, where it wants to go and how it is possible to bridge the gap between these two. This analysis can be conducted from various perspectives and, consequently, there are different types of methodologies to carry it out.

In order to achieve the project's objectives, alongside the analyses, each partner designed and implemented a pilot project. Specifically, Fondazione Brodolini designed the implementation of the *Human Capital Hub ECOS4IN*, a physical and digital platform, focused on the food & hospitality sector, which involved a sample of SMEs, belonging to the reference area, and students/under 30s.

The purpose of the document

At the start of the ECOS4IN Project, no one could have predicted the worst recession (known as the "*Great Lockdown*") since the *Wall Street Crash* of 1930, the third (possibly worst) economic, financial and social *shock* of the 21st century, after the attacks of 11 September 2001 and the financial crisis of 2008³. The harsh picture of 2020 has given way, in 2021, to a recovery, or rather what is technically called a 'positive rebound'. Lombardy's industrial production in the third quarter of 2021 grew by +2.5% (+12% compared to 2020). The employment rate in the Lombardy Region has reached almost 67% with a positive balance between new contracts and terminations⁴, companies estimate⁵ that in the next few years 30% of the workforce will be difficult to source due to the lack of skills of the candidates. This *mismatch* of skills is much higher among the Under 30s (the average difficulty of finding skilled workers and specialists in computer science is over 55%), a paradox if we consider that the youth unemployment rate in Lombardy is about 20% (against 17% of the EU average).

The general context is reflected in the priorities of the regional policies, which are, on the one hand, to support SMEs in their process of innovation and acquisition of 4.0 technologies, also through a redesign of the business organisation and, on the other hand, to equip the educational system in terms of training and skills related to advanced technologies, a point that is currently considered a limitation of the training system and a source of concern by the Lombardy robotics industry.

The ECOS4IN project, whose aim is to improve the implementation of the fourth industrial revolution in the Lombardy Region, is part of this process, which is constantly changing the

³ Economics Section, 2020, *For OECD the impact of the coronavirus on the economy already exceeds worst predictions*, 2020, AGI.

⁴ Outflows still reduced compared to pre-pandemic values also due to the effect of the so-called "freeze" on redundancies and the intensive use of the Cassa integrazione. Unioncamere, 2021, *The labour market in Lombardy 1st quarter 2021*.

⁵ Unioncamere, 2021, *EXCELSIOR Informs the employment programmes of companies surveyed by the Chamber of Commerce system*.

production sector. Starting from an accurate analysis of the Lombardy economic context, a tool called "*ECOS4IN Knowledge Base*" was created. This tool was the basis of the *Human Capital Hub* pilot project, which was also the validation test. The pilot project was created to provide a small target group (SMEs and the younger generations) with the necessary knowledge to increase their awareness of Industry 4.0.

Objectives Action Plan

The aim was to build an action programme capable of promoting specific "activities/conditions" to deal with the post-emergency situation, starting from the priority aspects of the "new world" in which businesses, operators, stakeholders and citizens find themselves living their new everyday life redefined on innovation, sustainability and the enhancement of human capital and knowledge.

In this direction the pilot project was launched in the Info Hub 4.0, at the *Milano Luiss Hub*, a single access point for Industry 4.0 and digital manufacturing aimed at facilitating the creation of new synergies between SMEs, community and students through cross-discipline activities, events and webinars. The design of an InfoHub 4.0 responded to two key concepts, "sustainability", i.e. the project had to coherently incorporate and accompany the provisions of the regional strategies of intelligent specialisation (RIS3)⁶, and "transferability", i.e. the Human Capital Hub ECOS4IN had to focus on the direct and practical needs of the economic and political fabric of Lombardy, seeking to create a sort of "instruction booklet" for the Region itself, aimed at achieving the objectives set out below.

Summary of Macro-objectives

- Increasing the implementation capacity of innovative projects by SMEs
- Developing new 4.0 skills

Analysis of the framework (ecosystem model for I4.0, SWOT & GAP)

The process of analysis of the territorial context sees the realization of an important step on 30 September 2019, when the regional referents of Lombardy, operating in the field of higher education,

⁶ For more information see: *National or regional innovation strategies for smart specialisation (RIS3)*. Available document: https://ec.europa.eu/regional_policy/sources/docgener/informat/2014/smart_specialisation_it.pdf

were invited to the first meeting of the regional stakeholder group⁷ at the infoHub4.0. The main objective of the meeting was to identify competences for Industry 4.0.

In the light of the information that emerged, it was possible to develop a SWOT (*Strengths, Weaknesses, Opportunities and Threats*) matrix for the Lombardy context of the IN4.0 general ecosystem model.

It thus emerges that the modified model of the regional knowledge ecosystem for Industry 4.0 aims at improving the know-how required for the development and use of Industry 4.0 technologies.

Within a very heterogeneous European framework, consisting of developed regions with well-performing innovation systems, characterised by strong links between its actors, as well as mostly rural and peripheral regions characterised by a low level of research and weak links within the innovation system, Lombardy is located within an intermediate band between these two opposites.

The strengths of the Lombardy Region are many: it is the most economically productive region in Italy, it already has a significant number of stakeholders relating to Industry 4.0 and as mentioned earlier, the Lombardy legislature has already launched a process to support small and medium-sized enterprises in their efforts to move towards the fourth industrial revolution. Among the opportunities, the possibility of attracting international investment and greater collaboration with the school system, aimed first and foremost at strengthening higher technical institutes, are highlighted. This development could in turn foster the emergence and consolidation of new skills and new professional figures capable of improving the competitiveness of Lombardy's small and medium-sized enterprises.

As regards the weaknesses, discussed in more detail in the next section, there is certainly a high level of fragmentation of micro (nano) enterprises in Lombardy, which are unable to access innovation frequently and easily, especially in urban areas. In addition, it is very difficult for businesses to access credit, as they often lack adequate guarantees. It is therefore clear that, as a priority, in order to foster the development of a regional knowledge ecosystem for Industry 4.0, it is necessary to work on the *mismatch of skills* between what is required by businesses and what the school education system is currently able to offer. It is therefore necessary to safeguard and transmit the 'know-how' typical of Lombard manufacturing.

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Name of activity	Description	Timeline/Duration	Resources (financial)*	Stakeholders
Mapping	Ecosystem analysis on defined clusters in order to detect the existing situation in terms of technological and economic development.	2 months	20,000	trade associations, study centres, DIH (Digital Innovation Hub), universities
Assessment 4.0 SMEs	Administration of a self-assessment questionnaire; company assessment with a 4.0 expert on the use of technology; assessment of soft-hard skills 4.0 SMEs; identification of areas for improvement.	6 months	13,000	SMEs, fab labs, 4.0 experts
Platform	Activation of physical-virtual platform for training, mentoring and peer-to-peer activities on 4.0.	4 months	10,000	SMEs, makers, experts, university students
Capacity Building	4.0 skills training course for company PMs and university students	4 months	14,000	fab labs, enterprises, universities, InfoHubs

Co-design	Workshops and one to one between SMEs, fab labs, sector stakeholders and students	2-3 months	8,000	SMEs, fab labs, 4.0 experts
Pretotyping	Using digital fabrication labs of info hubs for pretotyping	2 months	7,000	SMEs, fab labs.
Community Engagement	Simulation activities, dissemination events, webinars and workshops	10 months	8,500	cities, makers, students, public administrations, DIH (Digital Innovation Hub), trade associations
4.0 and inclusiveness, co-design and pretotyping	Construction of a methodology for small and medium-sized enterprises to adopt the disability perspective in digital transformation processes.	4 months	15,000	disabled people, fab labs, enterprises

- Costs were estimated on the basis of expenses incurred within the pilot project.

The cost estimate does not include management and administration costs, which vary according to the organisation adopting the Action Plan.

4. Declaration of intent

On behalf of Fondazione Giacomo Brodolini srl SB, the undersigned hereby declares that this Action Plan designed in the frame of the ECOS4IN project for implementation of I4.0 in Lombardia will be considered in the designing and implementation of the innovation methodologies and strategies in the forthcoming years.

15/3/2022

Legal Representative

Manuelita Mancini



Action plan for Industry 4.0 implementation into regional innovation strategy in partner area Lombardia

THE ECOS4IN PROJECT

1. INTRODUCTION

Info ECOS4IN

The 4.0 transformation processes are seriously challenging established paradigms and practices for Lombardy's companies, especially small and medium-sized enterprises, which are a fundamental component of the industrial and tertiary fabric of the Lombardy Region.

Very often, Lombardy's SMEs do not have the relational, human and/or technical resources to become part of international innovation ecosystems. This lack translates above all into greater difficulty in identifying the skills and knowledge needed to implement vocational training courses, with a view to enhancing and creating professional figures that meet the needs of businesses.

The international ECOS4IN (International Ecosystem for Industry 4.0) project was developed to meet this need. Through transnational cooperation of actors involved in smart specialisation strategies (RIS3) and Industry 4.0 implementation processes, it chooses to strengthen the innovation capacities of the regions, to make the local business fabric ready for the challenges of tomorrow. Implementation of the project started in April 2019 and will be completed in March 2022.

The phases of the ECOS4IN project are:

1. a preliminary analysis of the current implementation of Industry 4.0 in the Lombardy context;
2. construction of a general model of the knowledge ecosystem;
3. development of an action plan dedicated to the specialisation strategies of the Lombardy Region.

The first step by all seven partners involved was to build a general ecosystem model, considered for each individual context, through SWOT¹ and GAP² analyses, to understand the state of the context of reference.

¹ The SWOT (*Strengths, Weaknesses, Opportunities and Threats*) analysis/matrix is a 2x2 matrix in which internal and external factors that have a potential impact, positive or negative, on the business or activity to be carried out are appropriately identified and organised. Calicchio, 2017, *The swot analysis in 4 steps*, Kobo E.book.

² A *gap analysis* is a formal study of what an organisation is currently doing, where it wants to go and how it is possible to bridge the gap between these two. This analysis can be conducted from various perspectives and, consequently, there are different types of methodologies to carry it out.

In order to achieve the project's objectives, alongside the analyses, each partner designed and implemented a pilot project. Specifically, Fondazione Brodolini designed the implementation of the *Human Capital Hub ECOS4IN*, a physical and digital platform, focused on the food & hospitality sector, which involved a sample of SMEs, belonging to the reference area, and students/under 30s.

The purpose of this document is to define the action plan for the region Lombardy

At the start of the ECOS4IN Project, no one could have predicted the worst recession (known as the "*Great Lockdown*") since the *Wall Street Crash of 1930*, the third (possibly worst) economic, financial and social *shock* of the 21st century, after the attacks of 11 September 2001 and the financial crisis of 2008³. The harsh picture of 2020 has given way, in 2021, to a recovery, or rather what is technically called a 'positive rebound'. Lombardy's industrial production in the third quarter of 2021 grew by +2.5% (+12% compared to 2020). The employment rate in the Lombardy Region has reached almost 67% with a positive balance between new contracts and terminations⁴, companies estimate⁵ that in the next few years 30% of the workforce will be difficult to source due to the lack of skills of the candidates. This *mismatch of* skills is much higher among the Under 30s (the average difficulty of finding skilled workers and specialists in computer science is over 55%), a paradox if we consider that the youth unemployment rate in Lombardy is about 20% (against 17% of the EU average).

The general context is reflected in the priorities of the regional policies, which are, on the one hand, to support SMEs in their process of innovation and acquisition of 4.0 technologies, also through a redesign of the business organisation and, on the other hand, to equip the educational system in terms of training and skills related to advanced technologies, a point that is currently considered a limitation of the training system and a source of concern by the Lombardy robotics industry.

³ Economics Section, 2020, *For OECD the impact of the coronavirus on the economy already exceeds worst predictions*, 2020, AGI.

⁴ Outflows still reduced compared to pre-pandemic values also due to the effect of the so-called "freeze" on redundancies and the intensive use of the Cassa integrazione. Unioncamere, 2021, *The labour market in Lombardy 1st quarter 2021*.

⁵ Unioncamere, 2021, *EXCELSIOR Informs the employment programmes of companies surveyed by the Chamber of Commerce system*.

The ECOS4IN project, whose aim is to improve the implementation of the fourth industrial revolution in the Lombardy Region, is part of this process, which is constantly changing the production sector. Starting from an accurate analysis of the Lombardy economic context, a tool called "*ECOS4IN Knowledge Base*" was created. This tool was the basis of the *Human Capital Hub* pilot project, which was also the validation test. The pilot project was created to provide a small target group (SMEs and the younger generations) with the necessary knowledge to increase their awareness of Industry 4.0.

Objectives Action Plan

The aim was to build an action programme capable of promoting specific "activities/conditions" to deal with the post-emergency situation, starting from the priority aspects of the "new world" in which businesses, operators, stakeholders and citizens find themselves living their new everyday life redefined on innovation, sustainability and the enhancement of human capital and knowledge.

In this direction the pilot project was launched in the Info Hub 4.0, at the [*Milano Luiss Hub*](#), a single access point for Industry 4.0 and digital manufacturing aimed at facilitating the creation of new synergies between SMEs, community and students through cross-discipline activities, events and webinars. The design of an InfoHub 4.0 responded to two key concepts, "sustainability", i.e. the project had to coherently incorporate and accompany the provisions of the regional strategies of intelligent specialisation (RIS3)⁶, and "transferability", i.e. the Human Capital Hub ECOS4IN had to focus on the direct and practical needs of the economic and political fabric of Lombardy, seeking to create a sort of "instruction booklet" for the Region itself, aimed at achieving the objectives set out below.

Summary of Macro-objectives

- **Increasing the implementation capacity of innovative projects by SMEs**
- **Developing new 4.0 skills**

Analysis of the framework (ecosystem model for I4.0, SWOT & GAP)

The process of analysis of the territorial context sees the realization of an important step on 30 September 2019, when the regional referents of Lombardy, operating in the field of higher

⁶ For more information see: *National or regional innovation strategies for smart specialisation (RIS3)*. Available document: https://ec.europa.eu/regional_policy/sources/docgener/informat/2014/smart_specialisation_it.pdf

education, were invited to the first meeting of the regional stakeholder group⁷ at the infoHub4.0. The main objective of the meeting was to identify competences for Industry 4.0.

In the light of the information that emerged, it was possible to develop a SWOT (*Strengths, Weaknesses, Opportunities and Threats*) matrix for the Lombardy context of the IN4.0 general ecosystem model.

It thus emerges that the modified model of the regional knowledge ecosystem for Industry 4.0 aims at improving the know-how required for the development and use of Industry 4.0 technologies.

Within a very heterogeneous European framework, consisting of developed regions with well-performing innovation systems, characterised by strong links between its actors, as well as mostly rural and peripheral regions characterised by a low level of research and weak links within the innovation system, Lombardy is located within an intermediate band between these two opposites.

The strengths of the Lombardy Region are many: it is the most economically productive region in Italy, it already has a significant number of stakeholders relating to Industry 4.0 and as mentioned earlier, the Lombardy legislature has already launched a process to support small and medium-sized enterprises in their efforts to move towards the fourth industrial revolution. Among the opportunities, the possibility of attracting international investment and greater collaboration with the school system, aimed first and foremost at strengthening higher technical institutes, are highlighted. This development could in turn foster the emergence and consolidation of new skills and new professional figures capable of improving the competitiveness of Lombardy's small and medium-sized enterprises.

As regards the weaknesses, discussed in more detail in the next section, there is certainly a high level of fragmentation of micro (nano) enterprises in Lombardy, which are unable to access innovation frequently and easily, especially in urban areas. In addition, it is very difficult for businesses to access credit, as they often lack adequate guarantees. It is therefore clear that, as a priority, in order to foster the development of a regional knowledge ecosystem for Industry 4.0, it is necessary to work on the *mismatch of* skills between what is required by businesses and what the school education system is currently able to offer. It is therefore necessary to safeguard and transmit the 'know-how' typical of Lombard manufacturing.

Pilot Project

With the aim of designing and implementing a single access point for Industry 4.0 and digital manufacturing, the pilot Human Capital Hub ECOS4IN, , focusing on the food & hospitality

⁷ These include: TheFabLab, Junior Achievement Italia, Luiss University, FabriQ, Afol Metropolitana, In-Sprint, Consulting Agencies.

sector and involving various stakeholders from the Industry 4.0 ecosystem, was launched in November 2020.

The pilot project started its implementation phase in November 2020 and ended in September 2021 with the aim of providing a space where knowledge and skills related to Industry 4.0, the digital revolution and new technologies could be easily transferred to two essential actors in society: SMEs and students.

The pilot involved a total of almost 300 people, including SMEs, students and citizens, in the activities of the programme and, at the same time, it also generated several co-design and open innovation processes, strengthening a network of experts, companies and people curious about Industry 4.0 and promoting cross cutting opportunities aimed at the city ecosystem.

The involvement of SMEs was carried out in a three-phase programme: the first phase was dedicated to training; the second focused on skills assessment; and finally, the last phase involved a series of co-design activities in which companies worked together with students in the design and implementation of solutions.

The first step involved the creation of a call for applications to collect and select candidatures from SMEs operating in the food & hospitality sector. The call for applications, promoted through the channels of Fondazione Brodolini and the Milano Luiss Hub, saw the candidature of 10 economic actors, including SMEs and startups.

The companies selected to participate in the trial were:

- Turismiamo: a start-up offering innovative solutions for tourism using augmented reality;
- Frieco: a benefit company operating in the recycling sector that has patented a new high-tech device capable of reducing the amount of sorted waste;
- Eatour: a start-up that aims to reward sustainable production chains, facilitate business opportunities for companies working with CSR and raise awareness on climate change and sustainable development;
- KrillDesign: a start-up dedicated to circular economy;
- Decor Design: a start-up operating in the home & design sector with particular attention to sustainable design;
- Hotel Bonotto: a small hotel chain which in recent years has introduced important technological innovations in its day-to-day management.

A highly specialised training course was then delivered to the selected companies, involving: under 30s, facilitators and experts. At the same time, a company assessment was carried out to measure the state of internal digitisation and the assessment of cross cutting skills. In addition, five webinars dedicated to SMEs and the community, addressing various topics related to Industry 4.0 and involving various stakeholders from the food and hospitality sector, were designed and held.

In March 2021, SMEs started working together on co-design activities with students or recent graduates. Each company was paired with one of the students selected through an open call, and co-design activities were activated with the aim of designing and developing solutions that could solve the needs previously identified during assessment of the companies and startups.

At the same time, the following were organised: several meetings with stakeholders; 5 lectures on Industry 4.0, digitisation and new technologies; the webinar "Human Capital Hub ECOS4IN | Human capital between 4.0 and humanism", related to education and Industry 4.0; 7 online webinars specifically directed at the community and addressing different topics, such as tourism and industry 4.0, design thinking and the impact of digitisation.

Finally, a co-design panel was launched with the Hackability association, whose aim is to develop innovative solutions through digital fabrication tools that can help solve the daily challenges faced by people with disabilities. The aim of the panel was to implement adaptable solutions able to facilitate the use of closed spaces, such as museums and hotel rooms, taking into account the business needs as well as the personal needs of people with visual disabilities. The outcome of the panel was the prototyping of "Sherlock", a physical and digital device, able to act as 'conciierge', and enable descriptions in audio files useful to understand perfectly how the reception space is structured (hotel room, characteristics of the reception structure, information, etc.).

2 Background for the regional action plan (rationality for the activities)

The overall view on the ecosystem in the particular EC region

In this context of profound technological and digital change, a number of policies have followed one another in Italy in recent years, prompted in part by what was happening at European level, and aimed at promoting and incentivising the transition of the national business fabric to the 4.0 paradigm.

Lombardy was the first Italian region to decide to address the issue of the fourth industrial revolution, regulating it through a law approved on 10 April 2015 entitled *Manufacturing 4.0*, based on the prerogatives entrusted to it by Article 117 of the Constitution.

In 2020, the Italian government approved the 'Punto Impresa Digitale' (PID) (Digital Enterprise Point) project, as part of the activities envisaged in the Transition 4.0 Plan, the aim of which is to:

- promote the use by Lombardy's SMEs of services or solutions focused on new digital skills and technologies in implementation of the strategy defined in the Transition 4.0 Plan;
- promote digitisation and automation measures to ensure business continuity during the Covid-19 health emergency and post-emergency restart;

- encourage green production development models oriented towards quality and sustainability through products/services with lower environmental and social impacts.

These measures, also included in the National Recovery and Resilience Plan (PNRR), are in line with the guidelines already launched in Lombardy and have already made it possible to deploy resources to support the regional economic system. Among the most innovative elements adopted by the Lombardy legislature, it is worth mentioning:

- the implementation of the third edition of the call for proposals 'Development of innovative Enterprise 4.0 solutions' to support projects that are readily implementable and of potential market interest, with a focus on digital solutions with a view to sustainability.
- The "I4.0 Digital Vouchers" call for proposals, which aims to meet the innovation needs of Lombardy's SMEs through the digitalisation of processes, products and services. Projects must concern 4.0 digital innovation technologies.

Lastly, the 'Testimone' (Witness) project, a pilot project launched by the Lombardy Region to support local businesses involved in generational changeover or business transfer processes. Business continuity within and outside the family structure is one of the most delicate problems in the life cycle of Lombardy's MSMEs. The project, which is divided into three phases, aims to identify structural, diversified and replicable methods of intervention on the subject of generational changeover, starting from concrete cases. The third phase of the project, which brings together the results of the first two phases, is the systemisation of regional tools and those of the Chamber of Commerce system aimed at encouraging the transfer of business and the generational changeover in Lombardy's MSMEs.

Evaluation, what is missing and what must be developed

Small and medium-sized enterprises make up a substantial part of Lombardy's industrial and tertiary base, but they often lack the resources and skills to join technological innovation networks as large companies involved in technological innovation clusters (Science and Technology Parks, Technopoles, etc.) are able to do. A further aspect to be taken into serious consideration is the greater difficulty SMEs have in dealing with new technological and digital changes, which must be accompanied by effective strategies on the training front in order to increase the skills of candidates and workers.

Focusing on what has emerged from the analysis carried out, from comparison with the various stakeholders and from the state of the Lombardy entrepreneurial fabric, the focal points to be developed can be summarised in these two macro-areas:

1. increasing the reporting and implementation capacity of SMEs in the field of innovation;
2. developing and enhancing new 4.0 skills.

With regard to the first point, we consider repetition of what was implemented during the pilot project, which allowed companies not only to analyse themselves in a 4.0 perspective, but also to create relationships and processes capable of developing an implementation path of fundamental development for growth and change towards a 4.0 paradigm, to be very important. A second theme to be developed with a view to the future concerns the creation of an innovation platform (physical and virtual), within the logic of Open Innovation⁸, where actors can meet and collaboratively develop new ideas and share knowledge. The platform will offer services to collect, share and comment on ideas, to identify companies and makerspaces with complementary competences to create targeted and innovative partnerships, to exchange information on ideas and/or production methods and to make assessments on the feasibility and sustainability of new ideas.

This could include a toolkit consisting of: collaborative processes, available assets that explain to producers how to change their internal organisation; innovation methodologies developed with the support of experts and guides for co-creation and co-design of ideas, new business models for innovative products.

Linked to the second point, the difficulty of finding and enhancing the skills needed for change and development in businesses must be addressed. The adoption of the Industry 4.0 paradigm cannot disregard adequate investment in human capital: without skills, technologies cannot be implemented, improved or further innovated: ITS (Higher Technical Institutes) are therefore the natural allies of businesses in promoting training courses that can provide young people with skills that will enable the transformation of work.

There is, however, a major difficulty in developing the highly specialised technical and scientific system (ITS) in Lombardy (and throughout Italy), the main instrument for transmitting these skills, which is primarily due to the critical nature of the funding mechanism based on annual calls for proposals and strict constraints on expenditure items⁹.

Some ITS foundations have also underlined the fact that it is not always easy to find teachers able to train the skills covered by the most innovative courses. It is not enough for a worker to

⁸ Open Innovation (OI) is a concept that has been widely discussed and promoted in the manufacturing sector for decades. The term 'open' refers to the 'research and development' functions of companies, transforming them into an open and shared system in which the sources of new knowledge are both inside and outside the organisation. A perfect example of this knowledge-sharing process comes from fab labs (fabrication laboratories), makerspaces and hackerspaces.

⁹ Adapt, 2021, *Gli ITS lombardi e il Piano di Sviluppo nazionale Industria 4.0*, Confindustria Lombardia.

possess a certain body of knowledge, but he or she must also be able to communicate it to students, in a relationship that is still an educational and not solely a training relationship.

For this reason, our intention was to strengthen the relational network, between regional representatives, enterprises and stakeholders, formed and consolidated during all the meetings and discussions held during the project, capable of engaging in a concrete dialogue, with the support of FGB, for the definition of new development methods, both thematic and implementation, of ITS.

3. Description of the activities

Name of activity	Description	Timeline/ Duration	Resources (financial)	Stakeholders
Mapping	Ecosystem analysis on defined clusters in order to detect the existing situation in terms of technological and economic development.	2 months	20,000	trade associations, study centres, DIH (Digital Innovation Hub), universities
Assessment 4.0 SMEs	Administration of a self-assessment questionnaire; company assessment with a 4.0 expert on the use of technology; assessment of soft-hard skills 4.0 SMEs; identification of areas for	6 months	13,000	SMEs, fab labs, 4.0 experts
Platform	Activation of physical-virtual platform for training, mentoring and peer-to-peer activities on 4.0.	4 months	10,000	SMEs, makers, experts, university students
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Pretotyping	Using digital fabrication labs of info hubs for pretotyping	2 months	7,000	SMEs, fab labs.
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4.0 and inclusiveness, co-design and pretotyping	Construction of a methodology for small and medium-sized enterprises to adopt the disability perspective in digital	4 months	15,000	disabled people, fab labs, enterprises

- Costs were estimated on the basis of expenses incurred within the pilot project.

The cost estimate does not include management and administration costs, which vary according to the organisation adopting the Action Plan.

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4. Declaration of intent

On behalf of The Fablab srl, the undersigned hereby declares that this Action Plan designed in the frame of the ECOS4IN project for implementation of I4.0 in Lombardia will be considered in the designing and implementation of the innovation methodologies and strategies in the forthcoming years.

22/3/2022



Legal Representative
Francesco Colorni

