3.

Education & Training activities for I4.0

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UniTo is committed to tackle the training challenges for licensing the highly qualified staff that is needed to cover all the stages of the innovation value chain for industry 4.0, for the forthcoming years.

Along the years, UniTo has implemented activities that are of key importance for tackling the main issues towards a full embodiment of the objectives of I4.0. In all the currently operating degree courses, UniTo provides qualified teaching in Information and Communication Technologies, supported by a diffuse network of computer teaching labs. Moreover Entrepreneurship courses are active in several domains as well as a centralized initiative in the five main macro-areas. The training activities include thematic workshops and laboratory work-up tailored for the specific field of application.
The trainees are introduced to the use of tools like IoT, Arduino, etc. as well as to get practice on 3D-printing, Advanced Additive Manufacturing procedures, preparation and characterization of new materials, nanotechnology devices and advanced software management and development. Importantly an increasing number of courses are given in English.

UniTo will progressively **optimize its educational offer** to support small and large enterprises in their path **along the I4.0 revolution** through a full involvement of competences from all the science/technology domains and the most relevant Social Sciences & Humanities (SSH) fields. We aim at using the opportunity offered by I4.0 to develop a new paradigm of collaboration with the industrial world based on an intense research collaboration and training support to boost transfer of knowledge and innovation in manufacturing industry either on the technology side or in management and business models. Much attention is and will be devoted to continuing education activities (e.g. Master courses) to support industries in their specific, managerial and entrepreneurial, challenges that I4.0 poses on their organizational transformation, business model innovation, and technology management strategies.

In particular, **apprenticeship** represents an opportunity for a continuous of training/work exchange process, through which trainees can be hired by a company and simultaneously follow a training course (first and second level degree courses, master or PhD).

In this context it is worth of mention the recent activation of Industrial PhD programs in the field of Modeling and Data Science and Innovation for the Circular Economy.

UniTo has already implemented an extensive educational and training framework in a number of core fields (Hard skills) relevant to Industry 4.0. They are:

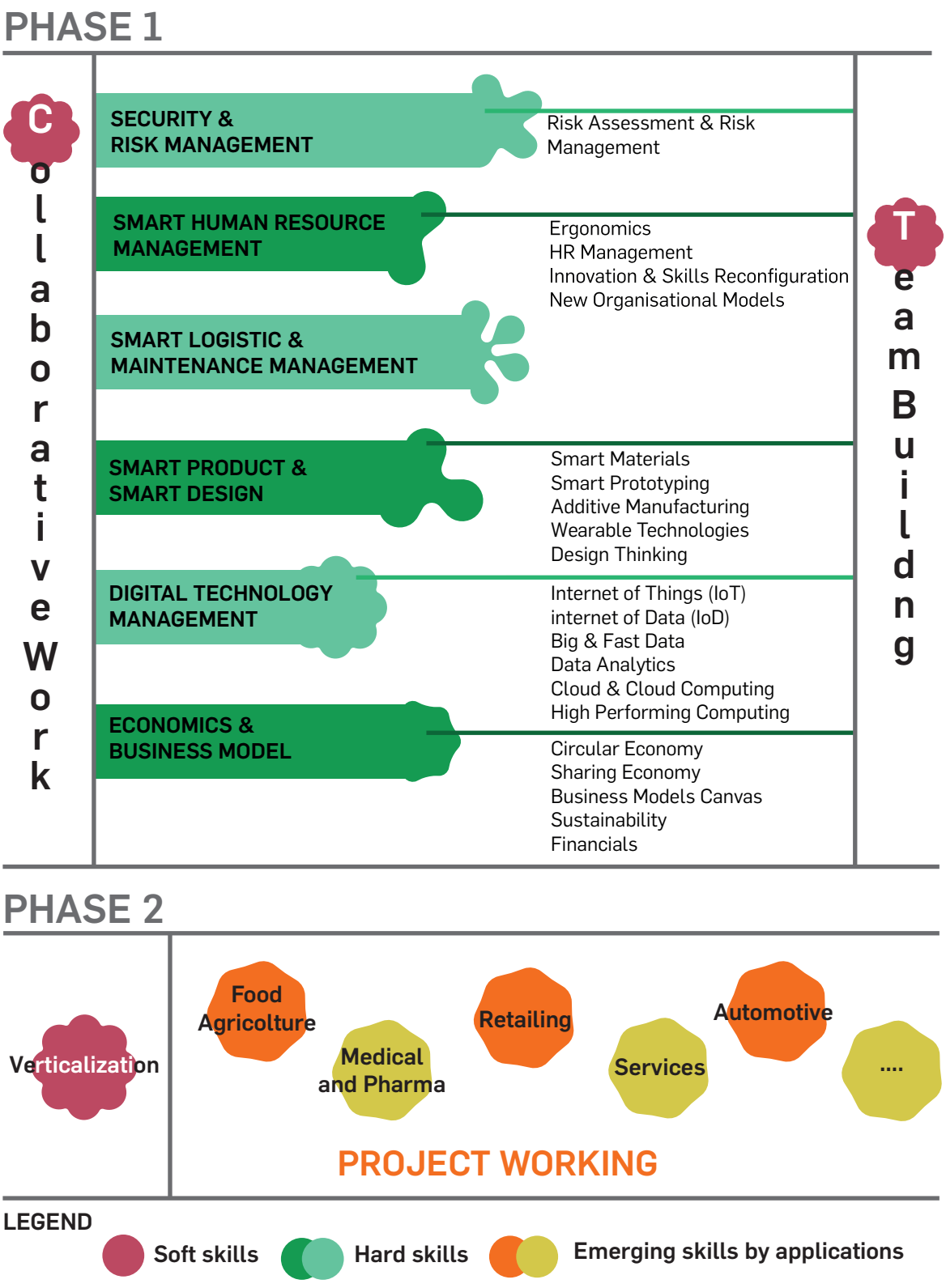
- **Economics and Business Models** (Circular economy, Sharing economy, Business Models Canvas, Sustainability and Financials)
- **Digital Technology Management** (Internet of Things IoT, Internet of Data IoD, Big & Fast Data, Data Analytics Cloud & Cloud Computing, High Performing Computing)
- **Smart Product & Smart Design** (Smart Materials, Smart Prototyping, Advanced Additive manufacturing, Wearable Technologies, Design Thinking)
- **Smart Logistic & Maintenance Management**
- **Smart Human Resource Management** (Ergonomics, HR management,innovation & Skills reconfiguration, New Organizational Models)
- **Security & Risk Management** (Risk assement & Risk Management)
- **Design and testing of innovative materials**
- **Design and testing of innovative sensors and devices.**

Furthermore, the learning process allows promoting the **development of Soft skills** related to **Team Building** abilities and **Collaborative Work competencies**.

The acquisition of Hard and Soft Skills enables trainees to play important roles in the complex pathway industries have to engage to adhere the new paradigm of Industry 4.0 (whatsoever is the specific activity field, i.e. AgriFood, Medical and Pharmaceutical, Retailing, Services, Automotive, etc…).

The overall links are summarized in the flow-chart (Fig. 6).

3. Industry 4.0



The development of both Hard and Soft Skills competencies allow to trainees to empower new skills to rightly identify and perform the challenges of Industry 4.0 and shape them for specific fields (i.e. Food Agricolture, Medical and Pharmaceutical, Retailing, Services, Automotive, etc.).