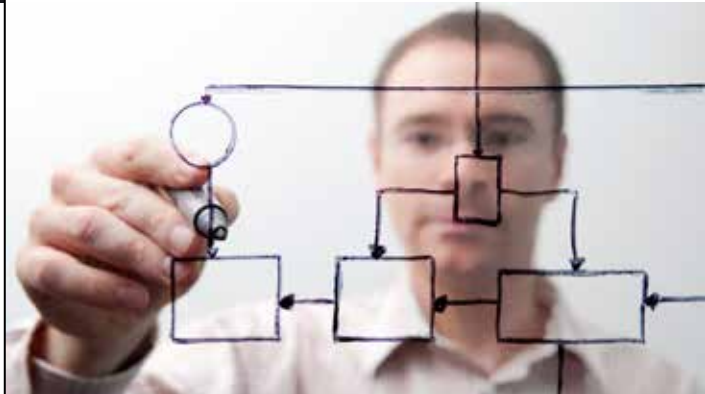# IT FOR INNOVATIVE SERVICES (ITIS)

LIST's "IT for Innovative Services" (ITIS) department develops innovative IT services within an open innovation process integrating all stakeholders concerned. Its research focuses on decisional knowledge dynamics, trusted service systems, and service engineering with impact.

More information at LIST.lu/itis

LUXEMBOURG INSTITUTE OF SCIENCE AND TECHNOLOGY

LIST

WHO WE ARE

The Luxembourg economy is strongly based on services, in particular on services that are based on IT. In this context, the "IT for Innovative Services" (ITIS) department at the Luxembourg Institute of Science and Technology (LIST) aims to bolster this domain through **multi-disciplinary** scientific and technological research leading to the development of innovative IT services.

ITIS gathers about **140 highly skilled researchers and engineers** from various disciplines to address technological, organisational, human, and economic aspects of innovative IT services.

Research areas are based around the innovation of services with a high level of information intensity and issued with a level of quality allowing for trust to be gained in their use and for generating value around new business models.

ITIS's research programme focuses on the challenges involved in exploiting massively interconnected systems of data, devices and people to enable informed decision-making, use of information systems in measuring and controlling the quality of services in networked enterprises, and tools for IT services innovation processes.

The objectives of ITIS fall directly within the framework of the **'Digital Lëtzebuerg'** strategy of the Luxembourg government. Design of innovative services is undertaken through direct cooperation with market stakeholders, within the framework of an **open innovation** approach and implementation of a **'living lab'** allowing to associate all stakeholders in the design and roll-out of the services.

The innovative IT services designed by ITIS are developed primarily in partnership with the following markets and sectors: construction, logistics and mobility, healthcare and IT professionals.

OUR RESEARCH TOPICS

1. Building trust around service systems

When private and/or public organisations collaborate, in particular when they use and combine their IT services, it is crucial for these organisations to trust each other, and to create trust towards their clients.

▶ **Our research challenge:** How to improve, regulate and evaluate the overall quality of services, notably those pertaining to security, availability, performance and compliance.

▶ **Keywords:** Service systems, management and GRC (Governance, Risk, Compliance), enterprise architecture and engineering, design and monitoring in real time of the qualities of a service

## 2. Developing new services with a high level of information intensity

The world of massively interconnected systems such as Linked (Open) Data, the Internet of Things and Social Networks triggers many challenges on how to manage this inspiring complexity of information sources, while opening up a myriad of opportunities for the creation of new knowledge-based services.

▶ **Our research challenge:** How to efficiently exploit the complex knowledge dynamics of such systems for collaborative and creative decision-making using smart technology enablers?

▶ **Keywords:** Technology-Based Assessment of collective decision-making and complex problem-solving skills, Human-Machine Interaction engineering, natural and adaptive interface, natural modelling, knowledge-based and context-aware personalisation and recommendation, crowd-computing, knowledge representation dynamics, multimodal analytics

3. Supporting innovation of IT-based services

In an economy that is dominated by services, it is key to fundamentally understand the mechanisms related to the innovation of IT services, in order to increase its socio-economic impacts.

▶ **Our research challenge:** How to support the innovation for services, in terms of an effective and creative mix of people, processes and IT enabled technology?

▶ **Keywords:** Process and support tools for innovative shared design of IT services: idea development, design, roll-out and management of change in organisations. New business models and measuring the impact of IT innovations
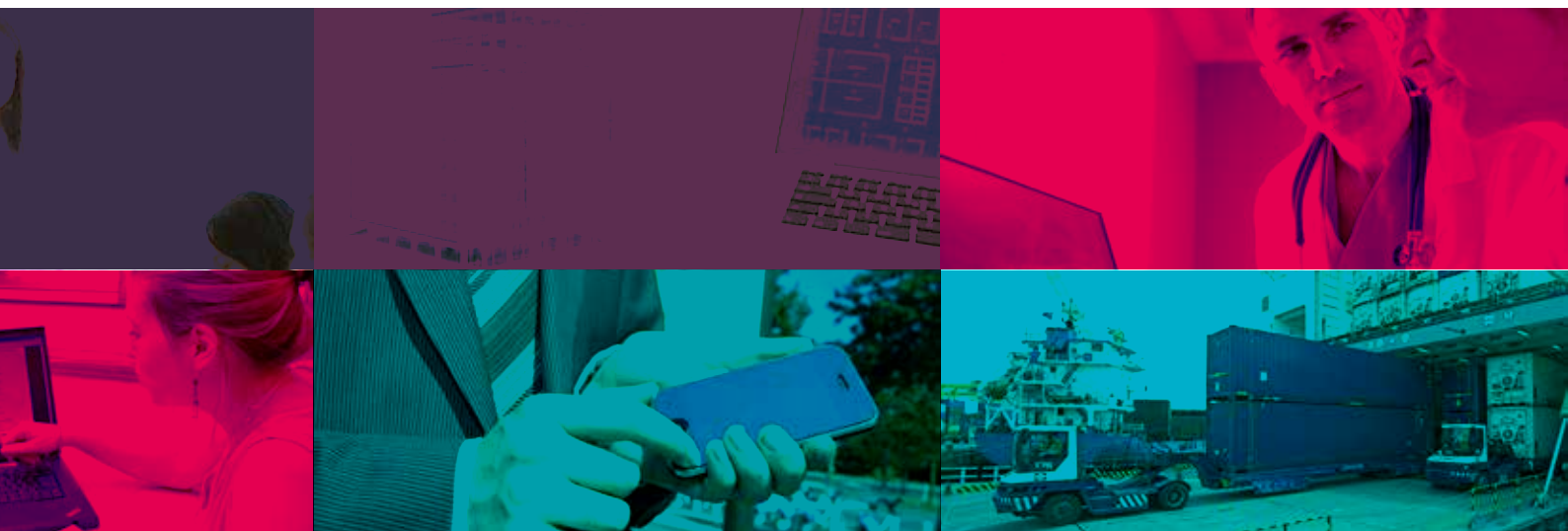
OUR TECHNOLOGICAL OFFER

Management of IT services:

▶ **TIPA®** a framework to assess the maturity of processes in various domains (ITIL, data archiving, information security)

▶ **TISRIM** a tool for analysis and management of information security risks

Information services:

▶ **CALLUNA** a software platform offering a host of interactive and customisable graphics to rapidly understand the critical aspects of a data set

▶ **MyMuseumGuide** a geo-localised mobile application to enhance the experience of museum visitors adapted to their preferences, walking paths and time available

Skills evaluation:

▶ Various **skills evaluation services and learning-based services** constructed around the Open Source Computer-Based Assessment TAO® software

Construction:

▶ **CRTI-weB®** an electronic platform to improve collaboration between stakeholders and exchange of best practices in the construction sector, in relation to Building Information Modelling (BIM) on construction sites

▶ **Last Planner** an innovation support tool, inspired by Lean Management, dedicated to improve the operational performance of building processes.

Healthcare:

▶ **GECAMED** a secure open source software platform developed in partnership with doctors for managing and using medical data

▶ **WikiFood** an advisory and learning tool for patients suffering from allergies in the food-related choices they make

Mobility and logistics:

▶ **TILT System** a patented indoor positioning system for mobile devices exploiting the existing wi-fi infrastructure, without requiring the installation of other extra hardware infrastructure

▶ **Tools for the design and simulation of support in personal mobility**, in particular within the framework of multi-mode transportation

▶ Use of IT for the **optimisation of supply chains** by taking into account environmental and economic factors

OUR APPROACH

The ITIS approach to the design of innovative services is based on **the involvement of various stakeholders**. Services are designed, developed, and deployed in a collaborative process with the major stakeholders, involving a process of open innovation in a '**living lab**' context, supported by a Creative Studio.

The **Creative Studio** allows designers to realise their ideas for new products and services within the framework of a high-tech environment supporting interaction and shared decision-making. This environment draws on a group of related technologies including natural user interfaces, sensors and artificial intelligence.

The Creative Studio is a platform accessible to all. In particular, it allows researchers to meet with professionals and users of different domains in implementing their innovations. Four sectors are targeted primarily, namely:

▶ The **construction sector** where certain major challenges affect the efficiency of design and construction processes, as well as effective property management. For both of these factors, our research concerns the nature and representation of information to be exchanged, as well as the development of collaborative platforms allowing for this interaction.

▶ The **freight/passenger transport and logistics sector**, a sector which, through an increase in e-commerce and globalisation of exchanges, requires innovative and effective information systems. The research we lead is based on tools for supporting decision-making, monitoring and real-time traceability, as well as optimisation and modelling of logistic chains.

▶ The **healthcare sector** (eHealth) represents a critical challenge for our society in terms of controlling costs and managing increasing volumes of information. Our research focuses on requirements in terms of management and decision-making support as well as aspects of interoperability standards and the quality of services covering the chain of the various stakeholders involved.

▶ The **IT professional sector** works towards bolstering the quality of services, thereby becoming a differentiating factor, notably for exports. Our research is aimed at identifying, quantifying and measuring the criteria for this parameter as well as evaluating associated risks, in particular for services provided by suppliers working in a network.

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ABOUT LIST

A key player in research and innovation in Luxembourg, the Luxembourg Institute of Science and Technology (LIST) covers with its 630 employees the domains of materials, environment and IT. As an RTO (Research and Technology Organisation) and with its interdisciplinary impact-driven approach, LIST contributes to the development of Luxembourg's economy and society.

More information: **LIST.lu**

OUR RDI DEPARTMENTS AND THEIR COMPETENCE DOMAINS

ENVIRONMENTAL RESEARCH AND INNOVATION (ERIN)
- **Water security and safety**
- **Plants for biomass, biopolymers and bioenergy**
- **Life cycle sustainability and risk assessment**
- **e-Science for environmental and biological applications**

MATERIALS RESEARCH AND TECHNOLOGY (MRT)
- **Nanomaterials and nanotechnologies**
- **Composite and advanced materials**

IT FOR INNOVATIVE SERVICES (ITIS)
- **Decisional knowledge dynamics**
- **Trusted service systems**
- **Service engineering with impact**

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