- Nível de maturidade 4.0 das empresas
- Capacitação 4.0 e sua motivação

Facens

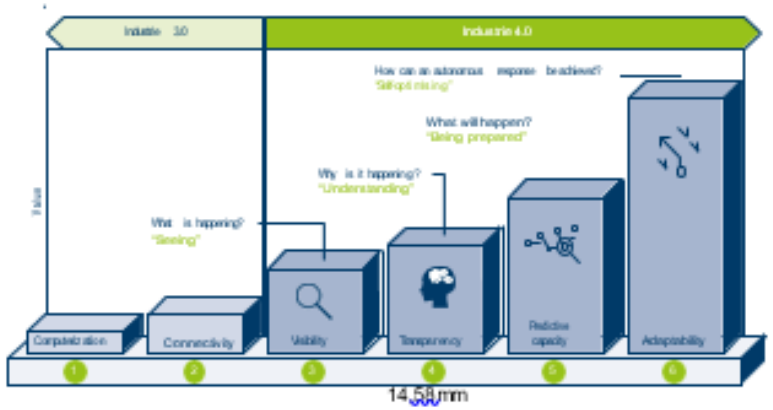
Inspiring Innovation

Nível de Maturidade

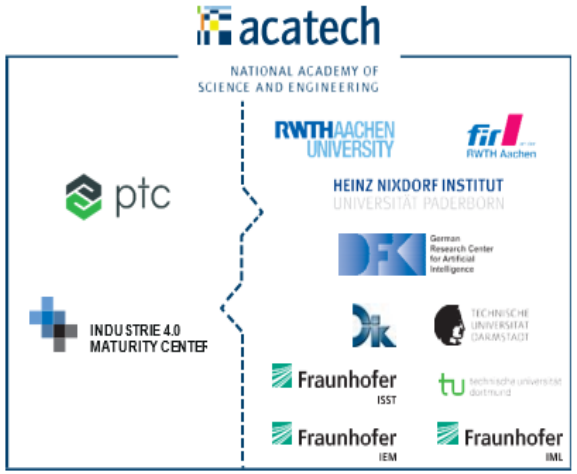
É um modelo de maturidade em **seis estágios** que analisa as capacidades nas **áreas de recursos, sistemas de informação, cultura e estrutura organizacional.** Cada estágio de desenvolvimento traz benefícios adicionais concretos para as empresas. O **desafio** é colocar esses princípios em prática. **Sabendo** especificamente **onde se encontram** há como gerar conhecimento a partir dos dados, possibilitando **processos rápidos de tomada de decisão e adaptação** em todas as partes da empresa. A partir deste início desenvolve-se um roteiro digital adaptado às suas necessidades individuais e pode ser usado para implementar a Industria 4.0 e transformar a empresa em uma organização ágil e que aprende.

2017

2020

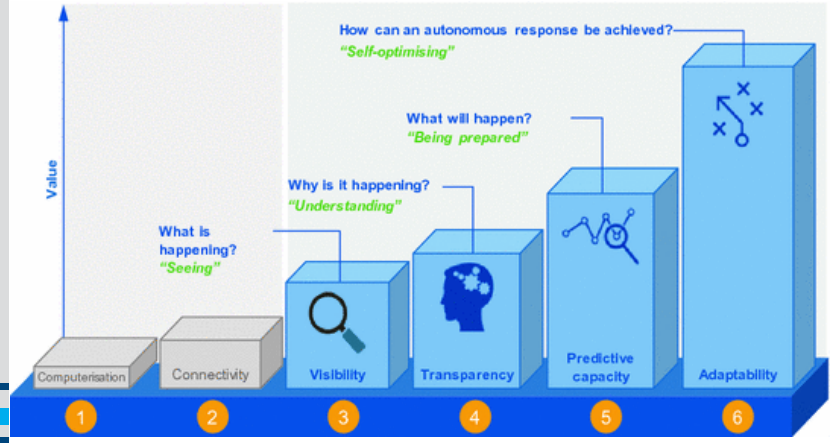


2020



Das Necessidades - Gerenciando a transformação digital de empresas

- O uso de tecnologias digitais, IIoT e máquinas para a implementação de soluções inovadoras da Indústria 4.0 também contribuem para melhorias **na velocidade de reação e na resiliência das empresas**.
- As empresas estão cada vez mais cientes do potencial da Indústria 4.0 e percebem a revolução 4.0 como uma **oportunidade de vantagem competitiva** para que possam se tornar líderes de mercado ou fortalecer sua liderança de mercado existente
- As empresas estão atentas, tendo cada vez mais resultados e agregando valor à sua instituição e neste mote abordando sua estratégia de negócios.

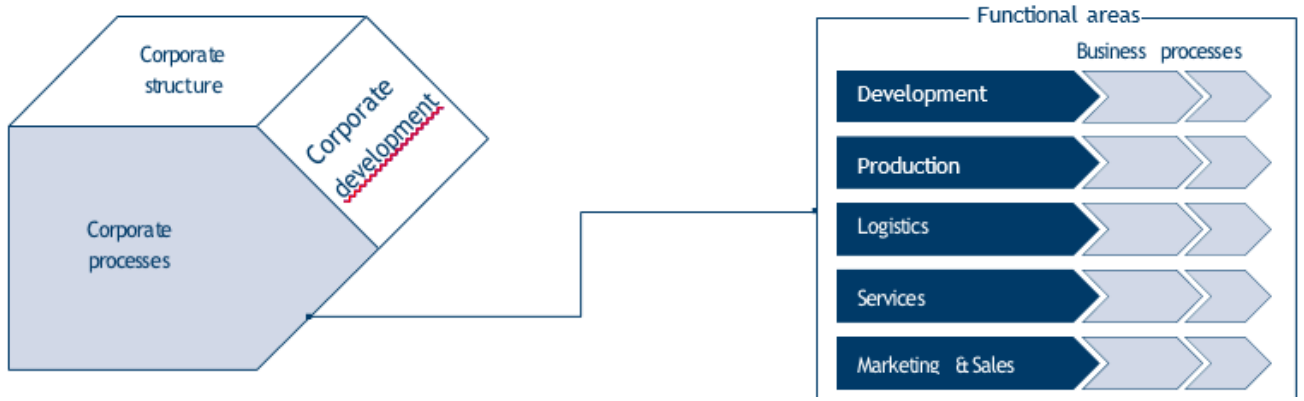


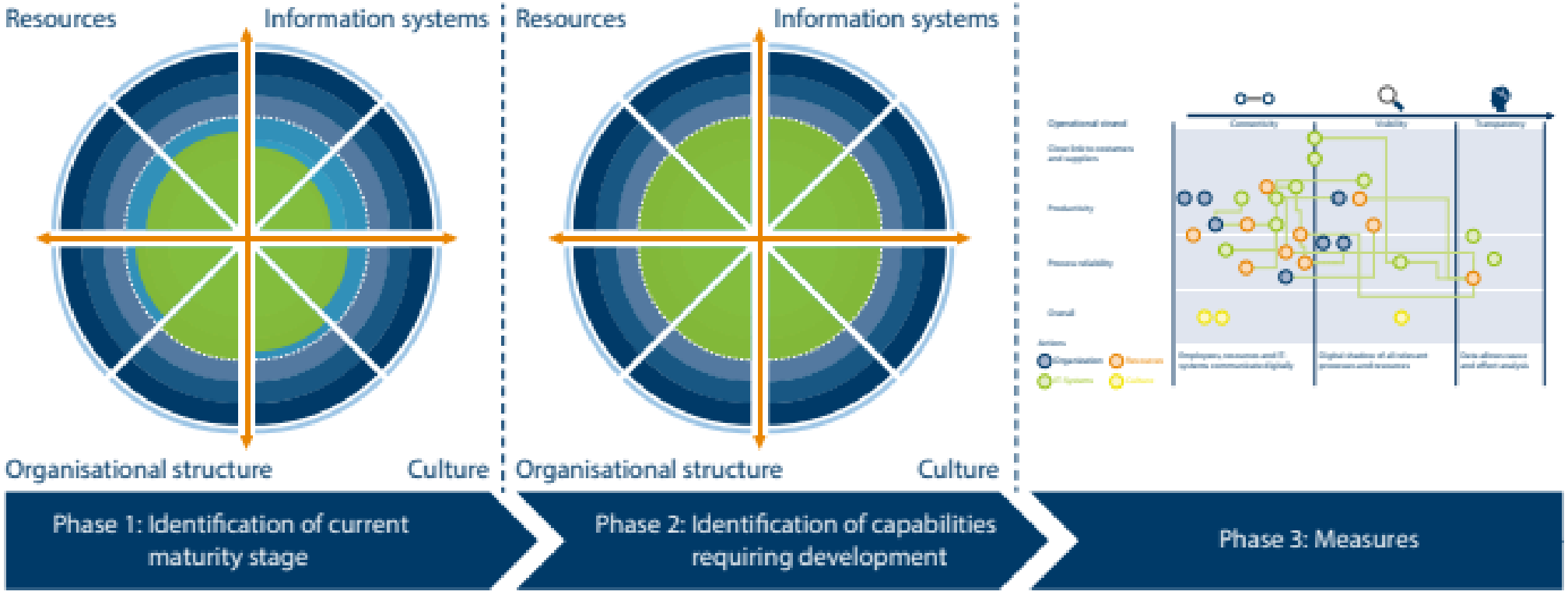
- Exemplos concretos de empresas que **implementaram com sucesso esta abordagem** e alcançaram um impacto positivo em seu desempenho são advindas de uma **implantação sistêmica, estruturada e não somente advinda de uma perspectiva puramente tecnológica** na busca de novas oportunidades de diferenciar seus produtos e serviços.
- Há a necessidade de uma **transformação na organização e cultura** para que possam se tornar o mais flexíveis e adaptáveis possível.
- O objetivo final é se tornar uma **empresa que aprende e ágil, capaz de se adaptar contínua e dinamicamente a um ambiente disruptivo** - principalmente para superar desenvolvimentos inesperados, como a crise do coronavírus.

Visão Geral do Processo - Contexto do Desenvolvimento e Avaliação

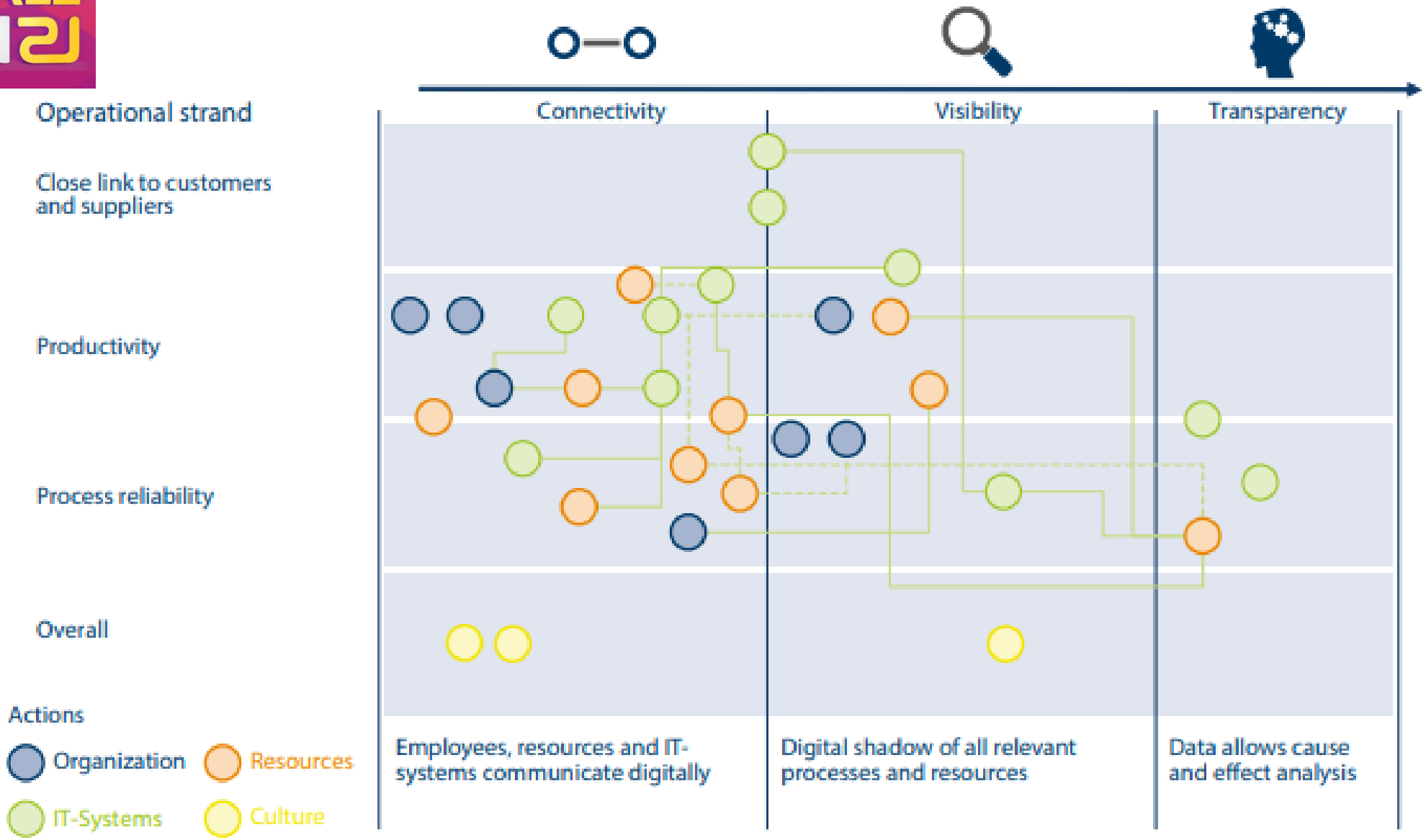
- Há avaliação dos processos atuais e a consequente **identificação das áreas** de atuação fornecem às empresas orientações específicas e práticas para moldar sua transformação digital.
- Avalia-se do ponto de vista tecnológico, organizacional e cultural, com foco nos processos de negócios das empresas.
- **O caminho será diferente para cada empresa**, inicia-se analisando a situação atual e os objetivos de cada empresa consolidado com os **objetivos estratégicos da empresa**, áreas em que pretende agregar valor, em que medida espera fazê-lo e os indicadores que podem ser utilizados para medir a resultados.
- Uma vez **identificados os objetivos**, pode-se analisar e medir até que ponto a Indústria 4.0 está presente de forma a estabelecer **quais as tecnologias e sistemas já implementados e como funcionam na empresa**.
- Com base nos resultados, o **próximo passo é identificar as capacidades** que a empresa **ainda precisa adquirir** para implantar com sucesso a Industria 4.0.
- Uma **análise de demanda** indica as medidas necessárias para adquirir os recursos ausentes podem ser reunidas em um **plano de transformação digital**.
- Toda empresa deve tomar uma decisão estratégica sobre os benefícios específicos que deseja alcançar. Essa **metodologia resulta na formulação de um roteiro digital** para todas as áreas relevantes, com um passo a passo sua transformação em organizações ágeis e de aprendizagem

Visão Estrutural

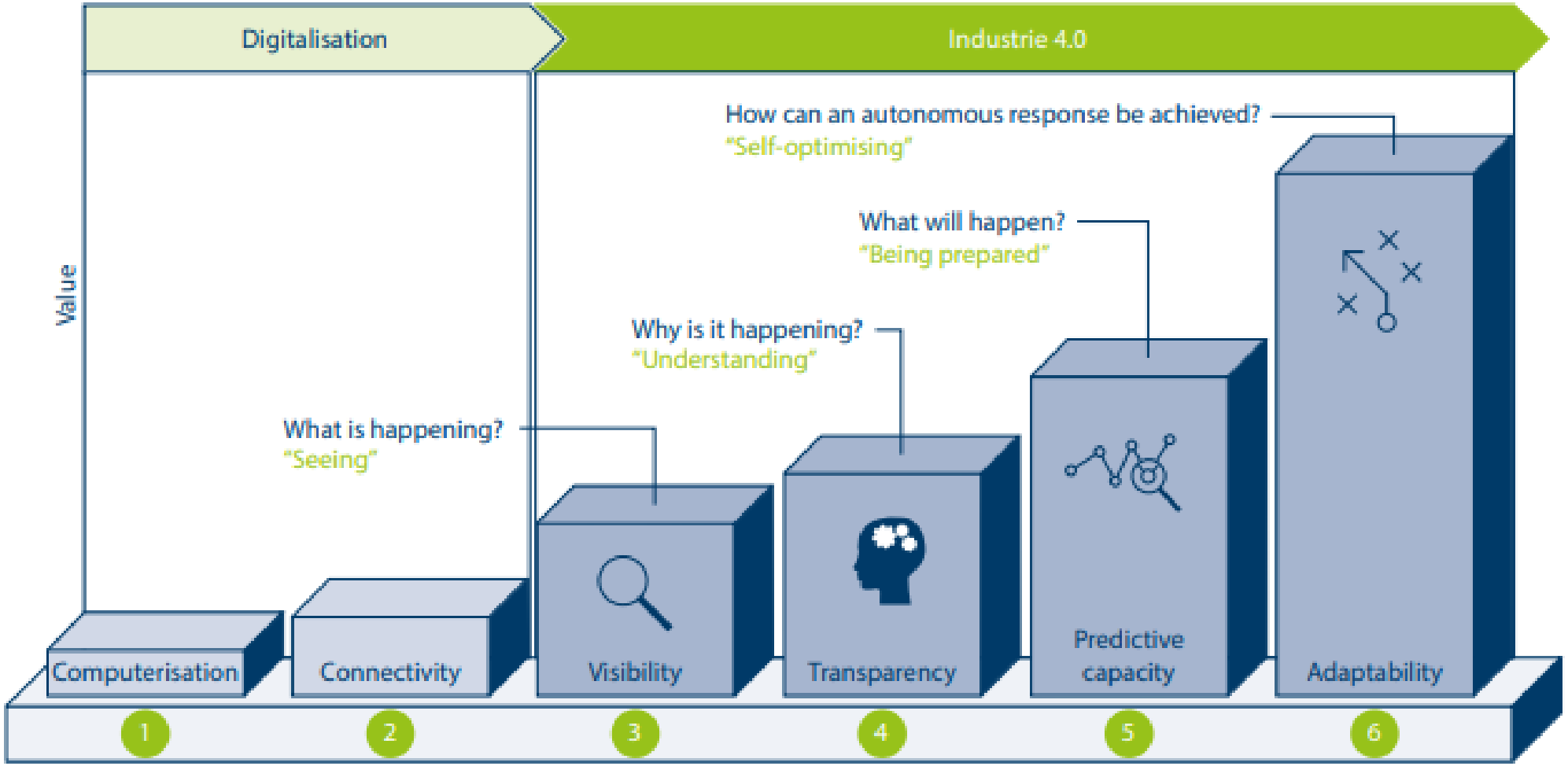




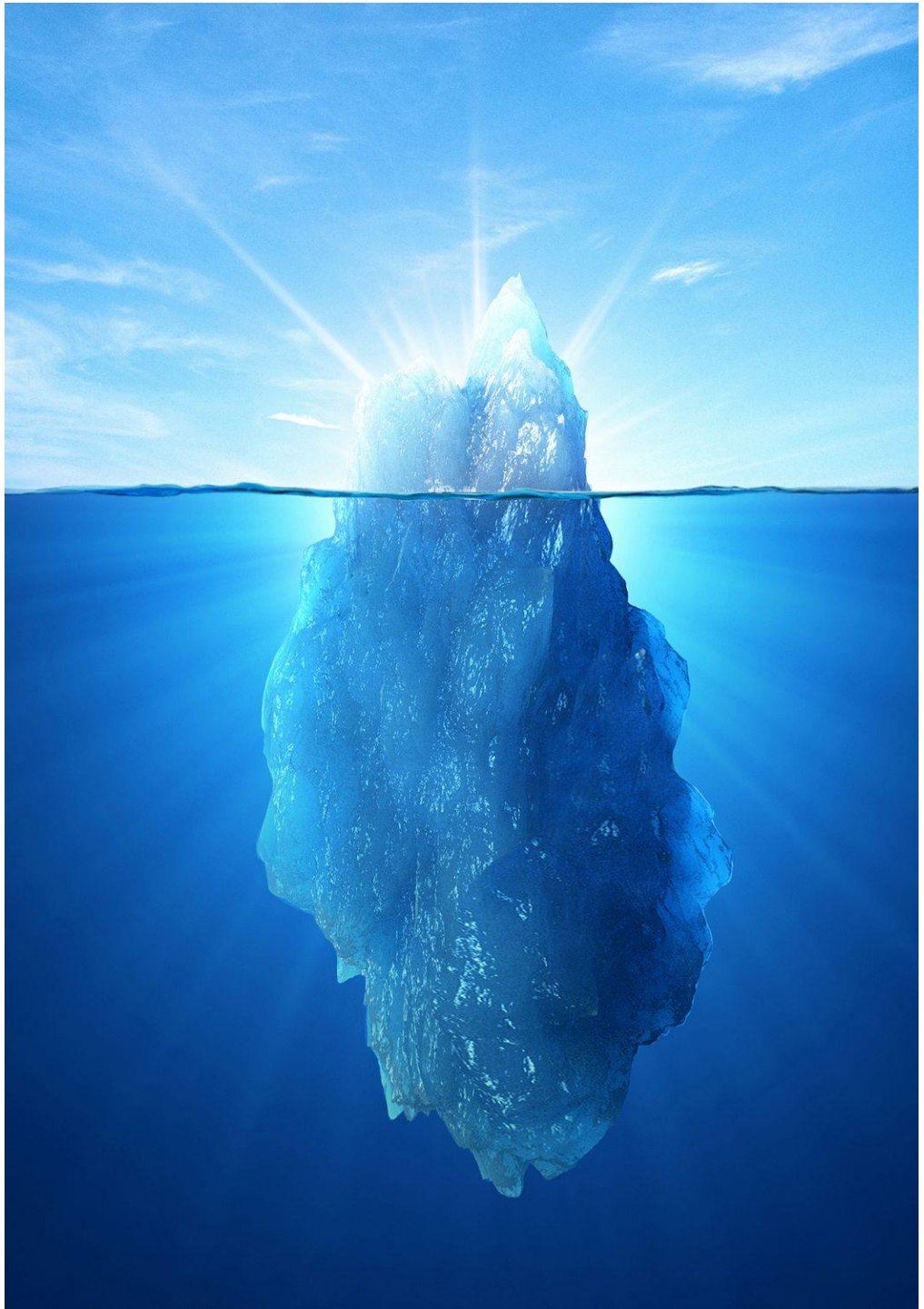
Medidas Indicadas (Plano de Ação)



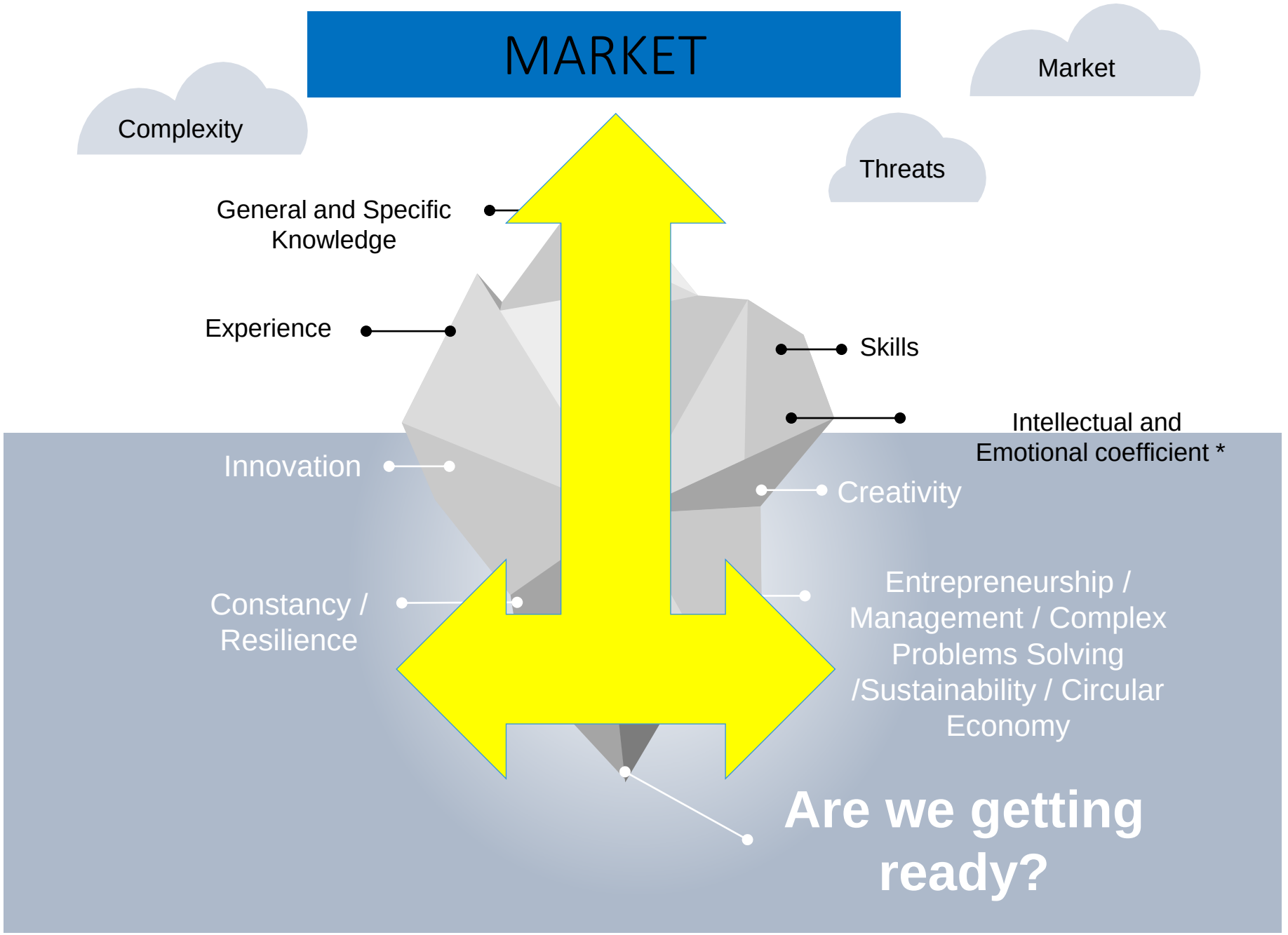
Localização Geral



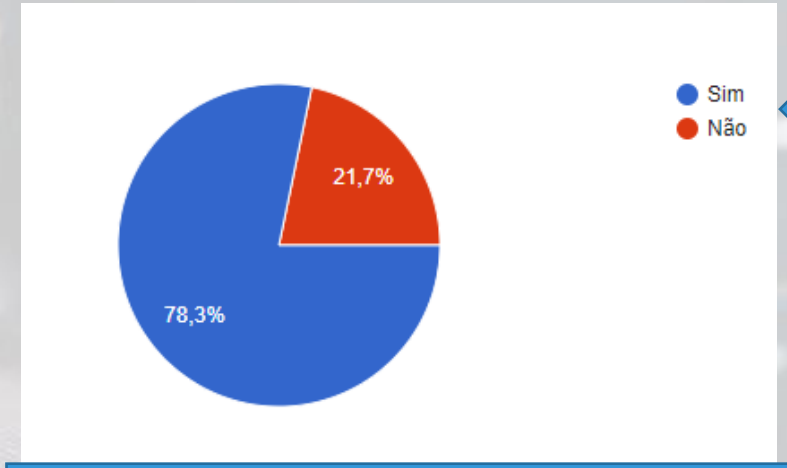
CONTEXT



CONTEXT

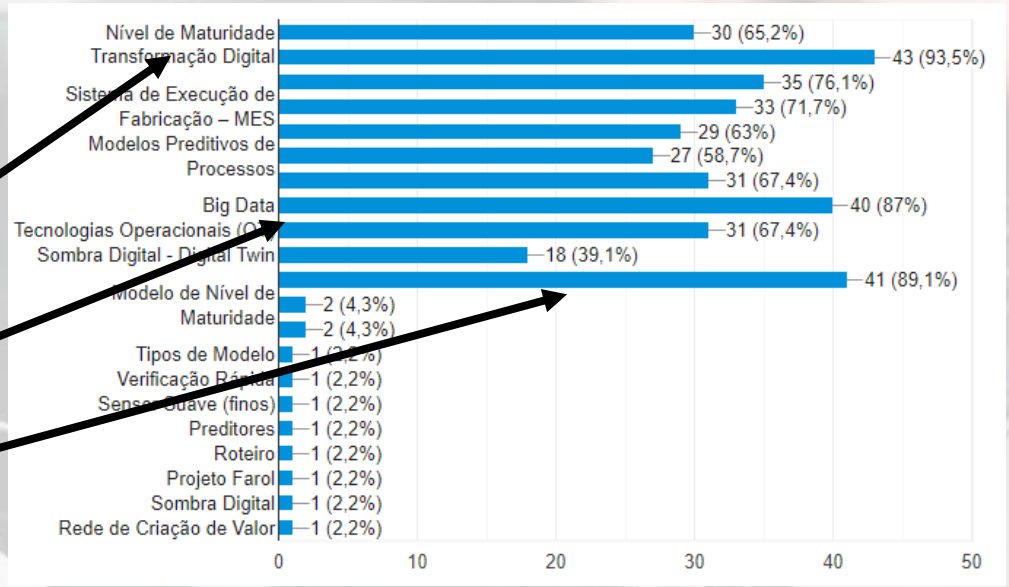

MARKET
Market
Complexity
Threats
General and Specific Knowledge
Experience
Skills
Intellectual and Emotional coefficient *
Innovation
Creativity
Constancy / Resilience
Entrepreneurship / Management / Complex Problems Solving /Sustainability / Circular Economy
Are we getting ready?

Survey among students and companies



78.3% were interested in an introductory course in industry 4.0 and postgraduate

Digital transformation, maturity level, big data and industrial Internet of things are the terms best known by the target audience.
And the ones that were requested the most..



Concepts of greatest interest raised and that indicate future interaction format also include maturity level & actions, MES, Simulations, Digital Twin ...

Active Methodology

Active methodology aims integrating research, guidance and team work, in which students create the link to their own learning.

Due to the difficulty and errors that can occur in the application of this methodology, many institutions are stuck with the old teaching model. A probable cause for this difficulty is that teachers are insecure to follow a new model of learning, to adapt to it, to make mistakes and learn from them, this model is still not well regarded by academic society (PUNDAD, 2008).

The active learning methodology follows a term “constructivism”, which opposes the idea of learning by memory, which is based on the old model of learning. stands out by understanding as a learning process and not by memorization figure shows the LMA 4.0 tables organized with a capacity of up to six students for practical activities.

The combination of theory and practical application creates a higher learning effect as any other qualification concept. Theoretical knowledge is transformed into expertise. A self-learning process becomes active which fosters a sustainable learning effect. The realistic environment stimulates all senses (ABELE E,2010).

Goals:

- **Activation of participants**
- **Interaction with participants and their empowerment**
- **Digital learning techniques and job-related qualification**
- **Interdisciplinary product/service and process development**
- **Industry 4.0 competencies**
- **Competency development**

Beyond and Environment Activities

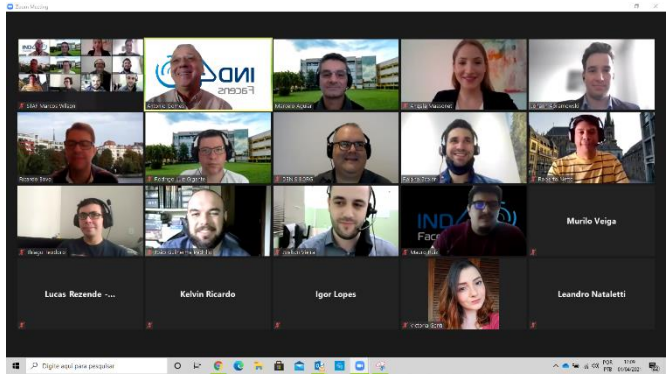
Activities in Industry 4.0 - Advanced Manufacturing having in 2014 Initial Workshop with the Fraunhofer Institute in Germany, updates have been made at least once a year, national and international partnerships, introductory and postgraduate courses

ESPECIALIZAÇÃO EM MANUFATURA AVANÇADA E INDÚSTRIA 4.0

https://www.facens.br/cursos/pos-graduacao/especializacao-em-manufatura-avancada-e-industria-4-0-inicio-previsto-29-08-2020

World Partnership Development

Workshops



IND 4.0 Facens

Speeches, Events, Hackathons, Partnerships, Companies visits…

Approach Companies and Academia

Industry 4.0 is a major aspect for bringing university and industry closer always in a win win approach.

- The national territory has been experiencing negative economic experiences in recent years. This is because the Brazilian industry does not have its own national technological development and ends up depending on technological imports. According to data collected by the Industrial Research Institute (IRI) in the United States, companies in developed countries are investing less in internal laboratories and research development and are looking for more partnerships with universities (TARALLI, 1995).

- In order to investigate the "win to win" of both, a specific survey was conducted on the benefits generated for the parties (SEGATTO-MENDES, 1996).

For universities:
- realization of the university's social function;
- obtaining practical knowledge about existing problems;
- New information into the teaching and research processes;
- obtaining additional financial and material resources;
- dissemination of the university's image.

For companies:
- access to the qualified human resources;
- solving technical problems;
- cost and risk mitigation and project development;
- new knowledge access at an academic environment;
- identification and future recruitment of students;

Learning Development

Adapting to a new era of teaching such as Industry 4.0 is not an easy task, all areas of application in the future will have to deal directly or indirectly with this environment.

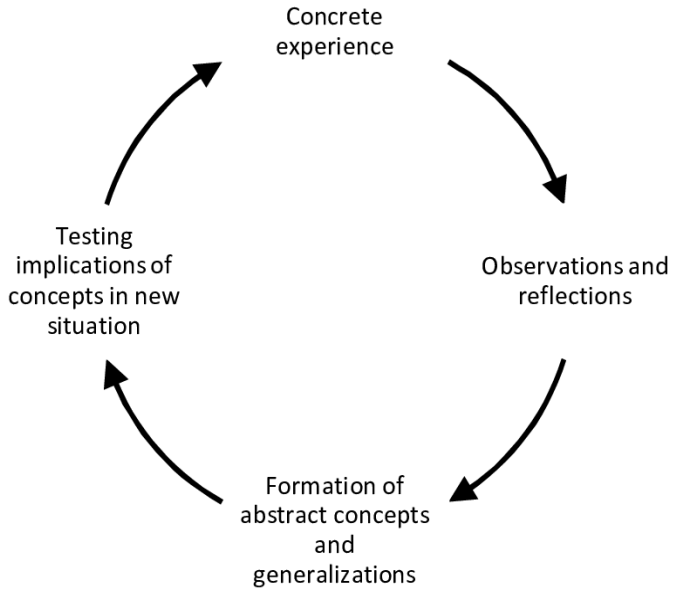
A learning process consists of four stages: The first stage is when faced with a new experience "concrete experience", the second stage is the reflection of this new experience implying understanding, the third stage is concluded as an idealization from reflection, from this one can learn from the experience acquired in the first stage, the last stage aims to apply learning to the formation of new concepts (KOLB, 1984).

The proposed laboratory fits into the learning process:

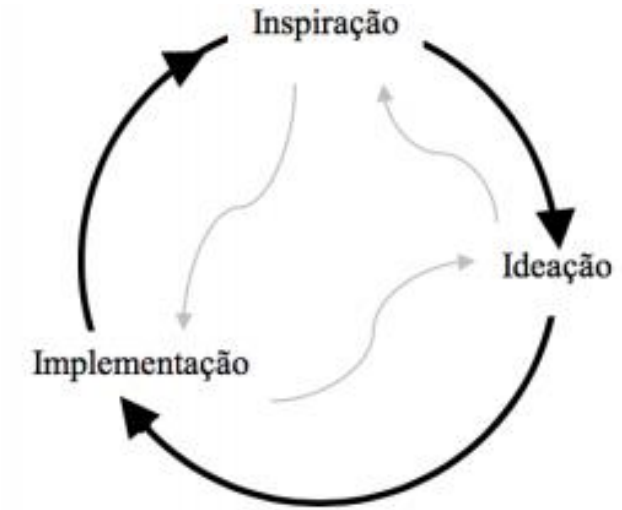
- the method provides concrete experience for students
- close to the professors the reflection and understanding are released
- idealization is achieved using the laboratory infrastructure.

This methodology has been applied in the organization and the curriculum has been reformulated based on the new demand for knowledge that the job market requires.

Reference : Kolb, 1984.



Reference : Brown, 2008.

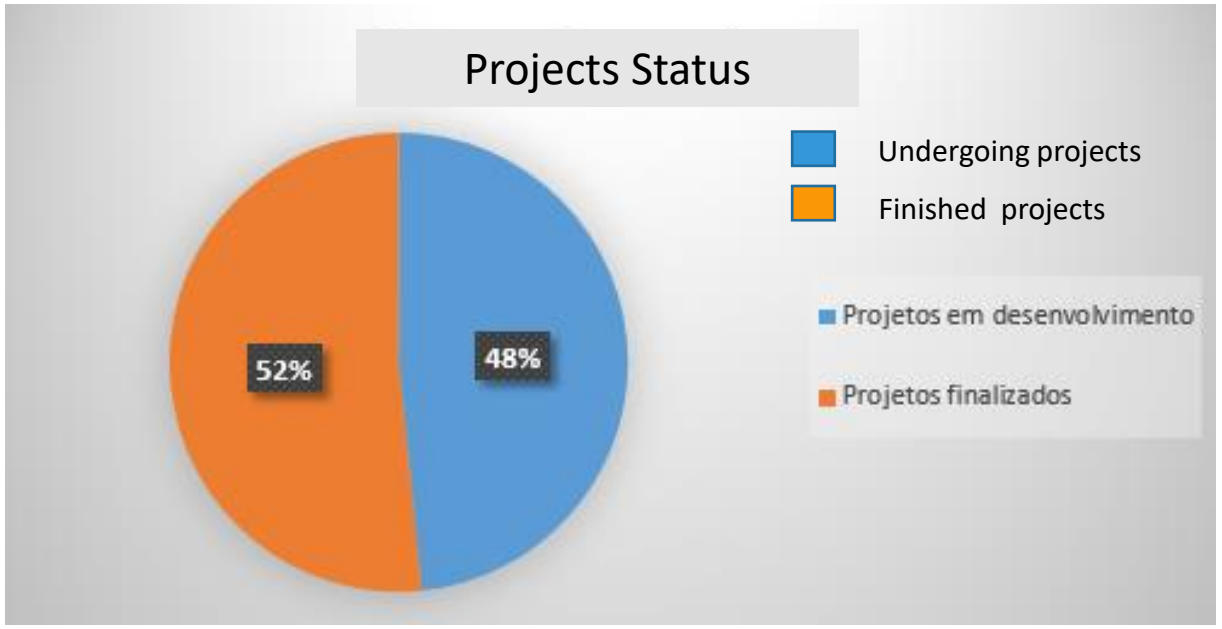


Fonte: Adaptado de Brown (2008).

Some Results und Undergoing Activities

The educational grade have been reformulate for undergraduate and graduate courses, incorporating new projects, experiments and opportunities within the institution. Also holiday, extension courses have been developed and applied. Undergoing government partnership for 4.0 concept deployment and people capacitation/training.

An example was the design by programming Melpha Basic V. A clamp for supporting pens was developed at FABLAB (prototyping laboratory) using a 3D printer. This lead to methodology expanding use possibilities of the robotic arm.



Initial result demonstrates that active methodologies when customized in their ecosystem bring 50% better performance in technical and also behavioral themes.

Some Results und Undergoing Activities

We do start with **“Menu of the day”,** as day routine we provide short workshops, interactive activities and related 4.0 subjects for the **people who are near by including community.**

Equipment retrofit also started for integrating a Coordinate Measuring Machine (MMC) next to the manufacturing cell, branching out the possibilities also with increased traceability using RFID technology.

FACENS aims to increase the number of partnerships and projects, the idea is that the team can work in **subjects that adds more value** and brings technological **return to the institution and partners**. One of the new projects that was started recently is a **KIT 4.0 that is designed to meet the needs of SMEs**, providing important data such as temperature, pressure, flow, vibration, etc. Keep on going the workshops, events and lectures focused on the theme of industry 4.0.

By 2021 lectures and workshops were already provided virtual mode, 08 4.0 consultants were trained for **maturity level** and we are part of the **4.0 Excellence Center Sorocaba Metropolitan Area** close to the companies, educational institutions, community and government.

Real companies environment and troubleshooting will took place

Muito Obrigado

Thank You Very Much

antonio.gomes@facens.br

https://www.linkedin.com/in/antonio-carlos-gomes-junior-540a561/