Proceedings of the International Conferences

Internet Technologies & Society

Applied Management Advances in the 21st Century

Sustainability, Technology and Education

15 - 17 December 2021

Edited by
Piet Kommers
Tomayess Issa
Adriana Backx Noronha Viana
Theodora Issa
Pedro Isaías

20 years iadis
international association for development of the information society

INTERNATIONAL CONFERENCES

ON

INTERNET TECHNOLOGIES & SOCIETY 2021 (ITS 2021)

APPLIED MANAGEMENT ADVANCES IN THE 21ST CENTURY 2021 (AMA21 2021)

AND

SUSTAINABILITY, TECHNOLOGY AND EDUCATION 2021 (STE 2021)

PROCEEDINGS OF THE INTERNATIONAL CONFERENCES ON

INTERNET TECHNOLOGIES & SOCIETY 2021 (ITS 2021)

APPLIED MANAGEMENT ADVANCES IN THE 21ST CENTURY 2021 (AMA21 2021)

AND

SUSTAINABILITY, TECHNOLOGY AND EDUCATION 2021 (STE 2021)

15 – 17 DECEMBER, 2021

Organised by

As a member of Crossref (a non-profit membership organization for scholarly publishing working with the purpose to make content easy to find, link, cite and assess) each published paper in this book of proceedings will be allocated a DOI (Digital Object Identifier) number for its fast and easy citation and indexation.

Edited by Piet Kommers, Tomayess Issa, Adriana Backx Noronha Viana,
Theodora Issa and Pedro Isaías

Associate Editor: Luís Rodrigues

ISBN: 978-989-8704-36-8

TABLE OF CONTENTS

FULL PAPERS

INTERNET TECHNOLOGIES & SOCIETY

SHORT PAPERS

INTERNET TECHNOLOGIES & SOCIETY

APPLIED MANAGEMENT ADVANCES IN THE 21ST CENTURY

POSTER PAPERS

INTERNET TECHNOLOGIES & SOCIETY

ENTREPRENEURSHIP AND CHANGING MINDSETS: A SUCCESS STORY

Teresa Dieguez[1], Manuel Au-Yong-Oliveira[2], Thiago Sobral[3] and Marc Jacquinet[4]
[1]*Polytechnic Institute of Cávado and Ave, Universidade Aberta, CiTUR, Portugal*
[2] *INESC TEC, GOVCOPP, DEGEIT, University of Aveiro, Portugal*
[3]*INESC TEC, Faculty of Engineering of the University of Porto, Portugal*
[4]*Universidade Aberta, Portugal*

ABSTRACT

The world is changing fast as never before, and work dynamics require innovative solutions. Higher Education Institutions (HEI) are key players within the dynamics of the knowledge economy. They provide society with qualified human capital and dedicate significant efforts to research and to the subsequent transfer of economically valuable knowledge. New challenges emerge, new solutions are needed and innovative approaches for problems and challenges are required. The future is uncertain, and entrepreneurship is a way of transitioning from surviving to thriving. More than ever, it is crucial to create methodologies to motivate students and teachers in order to bring Higher education closer to the labour market and raise the awareness of tomorrow's leaders to the need of building a sustainable future. This paper presents the co-creation model (students, facilitator, and company) carried out by the Polytechnic Institute of Cávado and Ave (IPCA), in Portugal, with its teachers and students, from all study cycles (CTeSP, Bachelor and Master) under the LinkMeUp initiative. The results show, above all, a high generation of ideas and an application of critical thinking to complex projects, using design thinking models and tools to solve learning challenges. Additionally, teamwork skills and multidisciplinary environments were worked on by IPCA's facilitators and students. This process has also fostered the creation of entrepreneurial proposals for 45% of the cases. It is, therefore, a methodology applicable to any scientific field and context, adding value to the HEI itself, since it allows the construction of a transforming mindset, reducing the stigma of failure and promoting measured and informed risk taking.

KEYWORDS

Co-Creation, Entrepreneurship, Innovation, Mindset

1. INTRODUCTION

The world is changing fast as never before, and work dynamics require innovative solutions (Anderson, Potočnik & Zhou, 2014). Organizations need to be increasingly competitive to face the generalized rise in competition, being the ability to anticipate changes and maintain or create competitive advantage their biggest challenge (Jacobides, 2010; Wright, Paroutis & Blettener, 2013; Shu-Hsiang, Jaitip & Ana, 2015; Hillmann & Guenther, 2021). Strategic tools have been developed to provide information from a holistic perspective and to support managers in decision making and strategic thinking (Clark, 1997; Gunn & Williams, 2007; Tassabehji & Isherwood, 2014; Nickols, 2016). Academic researchers are always developing formulas for performance improvement (Nobre, 2016), and some models already have been developed, including: SWOT (1960s), BCG Matrix (1970s), GE Matrix (1970s), Porter's Five Forces (early 1980s), Value Chain Analysis (1980s), Capability Analysis (1990s) and Strategic Options Analysis (1990s) (Bowman, Singh & Thomas, 2002), among others. However, management is a practice that combines science with art and experience (Mintzberg, 1973) while innovation follows nonlinear patterns across the domains of science, technology, and the economy (Leydesdorff, Rotolo & de Nooy, 2013).

Higher Education Institutions (HEI) are key players within the dynamics of the knowledge economy (Etzkowitz & Leydesdorff, 2000; Czarnitzki, Miller & Reid, 2012; Hadad, 2017). They provide society with qualified human capital, dedicate significant efforts to research and to the subsequent transfer of economically valuable knowledge. They also must prepare and educate their employees, students, and other stakeholders for economic, technological, societal, and environmental transformations (Messmann, Mulder & Palonen, 2018).

New challenges emerge, new solutions are needed and innovative approaches for problems and solutions are required (Dieguez, 2021). This study, carried out at the Polytechnic Institute of Cávado do Ave, in Portugal, seeks to share good practices in promoting qualified entrepreneurship as an innovation project in co-creation within the business community, generating ideas and creating new companies. This theme is justified by the imposition of working the curricular contents in remote education, bringing the skills developed in HEIs closer to the required skills in the labour market, thinking about the future in a strategic and proactive way. As main benefits it is expected that the innovation project in co-creation will develop the necessary 21st century skills, where ecological and societal objectives are carefully integrated into viable, profitable, and sustainable business models.

2. LITERATURE REVIEW

The Covid-19 pandemic brought new rules and behaviours. At the time of writing, the world is still in semi-confinement and all citizens are asked to respect social distance and stay at home. These restrictions often provoke negative feelings and depression (Cacioppo & Hawkley, 2009), but they can also trigger positive types of behaviour, such as the developing of new skills, new knowledge, and more interaction with one's surroundings (Donthu & Gustafsson, 2020). The world is changing and Covid19 is becoming the accelerator of one of the most disruptive workplace transformations in recent years (Carnevale & Hatak, 2020). The future is uncertain, and entrepreneurship is a means of transitioning from surviving to thriving (Bullough & Renko, 2013; Devece, Peris-Ortiz & Rueda-Armengot, 2016; Obschonka, 2016). The current Covid19 challenge has the potential to create a space for Higher Education Institutions (HEI) to fulfil their mission of teaching entrepreneurship (Maritz, Perenyi, de Waal & Buck, 2020) and this means that HEI are not only responsible for developing employability attributes that enable lifelong learning and foster it, but also provide a full range of possible developments related to entrepreneurship education (Barnett, 2017).

Nevertheless, the main goal of most entrepreneurship education rests on the development of entrepreneurial skills (Ernest, Matthew & Samuel, 2015; Dieguez, 2017; Dieguez, 2021) which, according to Lans, Blok and Wesselink (2014), is based on opportunity, social relationship, management, industry specificity and self-efficacy. The question is "how to work these competences, especially in atypical times?" and more than ever it is crucial to create methodologies to motivate students and teachers, to bring HEI closer to the labour market and raise the awareness of tomorrow's leaders to build a sustainable future.

3. PEDAGOGICAL PRACTICE DESCRIPTION

In this project, active and innovative learning methodologies are used, such as Design Thinking, Double Diamond, Collaborative Learning, Peer Learning, and Challenge-based learning experience, among others.

3.1 Main Goals and Target Audience

This project aims to stimulate students into having reflective thinking and a scientific spirit, as well as an entrepreneurial mindset, providing them with transversal skills, essential for successful collaborative work in the labour market. Based on a holistic approach, the project is characterized by the use of active methodologies in a co-creation environment. By applying knowledge in a real context, students can develop with greater focus some of the necessary skills for the 21st century (fig. 1), namely by: i) promoting and creating conditions that allow teachers to improve pedagogical practices: new tools and methods, interaction and cooperation; ii) contributing to the continuous improvement of the teaching-learning process and exploring the co-creation process: as facilitators and co-creators; iii) developing and enhancing the skills and interconnection between teachers: communication and collaboration, as well as interaction with entities; iv) solving real challenges with teams of students and members of an external organization (company, unit, etc.): strengthening the soft skills of critical thinking, communication, teamwork and collaboration; v) working autonomously.

This paper presents the co-creation model (students, facilitator, and company) carried out by the Polytechnic Institute of Cávado and Ave (IPCA), in Portugal, among its teachers and students, from all study cycles (CTeSP – short cycles, Bachelor and Master) under the LinkMeUp initiative. Privileging partnerships with the surrounding community, 11 business challenges were accepted, and multidisciplinary teams were formed, with a total of 66 students. Starting in March 2021, in a co-creation context, for 8 weeks and with future-oriented organizations, the students, accompanied by their teachers, identified, and developed complex challenges.

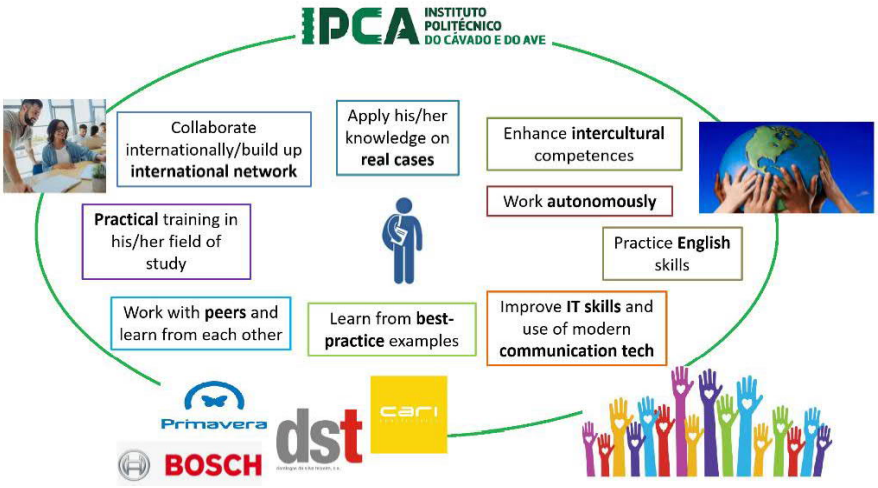

Figure 1. What the student wants/needs

3.2 Methodology

Based on the proximity between the Polytechnic Institute of Cávado and Ave (IPCA) and the local community, a pool is created (companies and non-profit organizations), where all the challenges (economic and societal with a focus on future megatrends) that institutions make to the educational community are placed. Additionally, an opportunity is opened for students to apply to the project and choose the challenges with which they most identify. After a selection based on pre-defined and rigorous criteria, students are selected according to their background and profile. The motivation letter is one of the determining elements in the process, and communication in English is also required. The teams should be multidisciplinary and from various study cycles. The desirable number of students per team is 5 to 6 elements.

After selecting the students, an IPCA Teacher and the representative of the institution that posed the challenge become the Facilitators of the co-creation project. Starting with a meeting where all the elements of the team get to know each other, the institution launches the challenge and presents the problem it intends to overcome. A schedule is agreed upon, preferably weekly, for short briefings and reflections on the work developed so far. Instructions are given on the methodology and objectives to be achieved each week. Regarding the students' role, a greater involvement is sought, estimated at an average of 8 to 10 hours per week. Students should start by making a personal mindmap and a mindmap about their understanding of the challenge, followed by a PESTLE analysis. The genesis of the co-creation project lies in the understanding of the phenomenon, its context, and the people in it. In this sense, the mapping of stakeholders, the research design, and the collection of insights are done. Through interviews, an attempt is made to identify the reason for people's behaviours, namely regarding motivation, values, and attitudes, as well as driving forces that move the selected groups. With observations, students identify some details that were not mentioned in the interviews. In doing general research, through benchmarking exercises and reading online industry reports, they gain inspiration for a more holistic approach.

In the following stages, students try to identify the megatrends and signals that are likely to condition the industry/activity they are analyzing, to build a long-term solution that is proactive rather than reactive. Scenarios are built with possible solutions, the results are discussed, and a report is written. The results of all co-creation projects are also presented in a final pitch session to share best practices.

ISBN: 978-989-8704-36-8 © 2021

3.3 Evaluation

The project presented in the scope of this study is a pioneering project, which is still ongoing, for at least two more years. The social confinement imposed by Covid19 was overcome using computerized means. It is an active methodology that has managed to capture the attention of the involved students and institutions that pose the challenges to the IPCA universe. All those involved were very enthusiastic about the discovery process and the new perspectives that were opening. Using a lot of visual registering, the development of the solution was always done in a collaborative way, preferably on the platform "Miro" (miro.com), and examples can be seen in figure 2 and figure 3.

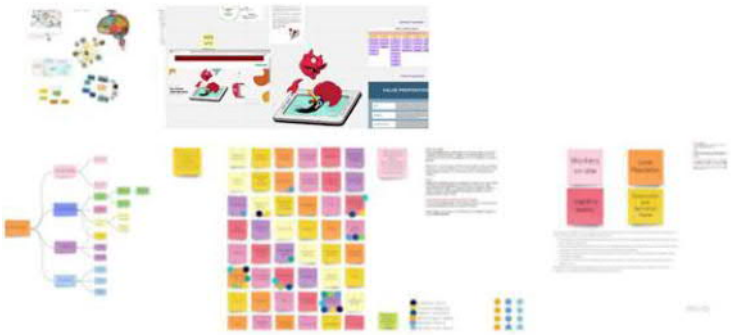

Figure 2. Design research

At the end of this Project, students are expected to be able to: i) apply critical thinking, creative problem solving concepts, design thinking models and tools to solve learning challenges; ii) work in multidisciplinary and co-creation environments; iii) identify and define complex problems and understand the value chains in different solutions; iv) identify meaningful insights from noise; v) communicate information, ideas, problems and solutions to specialized and non-specialized audiences with clarity: vi) propose solutions to real societal problems and challenges that require innovation and a diverse set of skills.

Figure 3. Co-creation in pandemic times

4. RESULTS, IMPLICATIONS, AND RECOMMENDATIONS

The future is uncertain and the collaboration between Higher Education Institutions (HEI) and the local business community is crucial for the development of the region and the well-being of the people. The challenges are very significant, and success is strongly dependent on the quality of the human capital that goes out into the market. HEIs, through this type of projects, can make a very valid and highly differentiating contribution. The main advantages of these projects in a co-creation environment are: i) the development of projects using the best practices of design thinking, ii) the awareness and involvement of students in real projects, iii) the construction of interdisciplinary student teams, iv) the experience of an 8-week co-creation project, v) help in identifying significant perspectives from the results and vi) the reflection on the perceived competences.

As this is a pioneering active methodology, it is recommended to be applied in curricular and extra-curricular units that demand, above all, challenging solutions, and critical and prospective thinking. This methodology, by demanding characteristics related to an innovative dynamic, will enhance adaptability, agility, and the capacity to initiate change.

5. CONCLUSION

Higher Education plays an important role in laying the foundations for the development of competences for sustainable entrepreneurship, competences that go beyond disciplinary knowledge and encompass skills, knowledge and attitudes oriented towards a holistic and sustainability-driven approach. These competences can be seen as an incentive for the creation of a more critical, innovative, and reflective culture that often questions its own routines, assumptions, and guiding principles. This study presents an interesting active methodology, easily replicable and with the advantage that it can be efficiently and effectively used in virtual, hybrid and face-to-face environments. The results show above all a high generation of ideas and application of critical thinking. A high adherence to design thinking models and online and collaborative tools to solve learning challenges is also registered. Additionally, the valuing of teamwork and multidisciplinary environments, by facilitating teachers and learners, is achieved. A transformative mindset is created, reducing the stigma of failure, and promoting measured and informed risk-taking. The promotion of entrepreneurship and high time commitment will naturally follow.

REFERENCES

Anderson, N., Potočnik, K.& Zhou, J. (2014). Innovation and creativity in organizations: A state-of-the-science review, prospective commentary, and guiding framework. *Journal of management*, *40*(5), 1297-1333.

Barnett, R. (2017). *The Ecological University a Feasible Utopia*. Routledge: London, UK.

Bowman, E., Singh, H. & Thomas, H. (2002). The domain of strategic management: History and evolution. In A. Pettigrew, H. Thomas & R. Whittington, Handbook of Strategy and Management. London: Sage Publications.

Bullough, A. & Renko, M. (2013). Entrepreneurial resilience during challenging times. *Business Horizons*, *56*, 343-350.

Cacioppo, J.T. & Hawkley, L.C. (2009). Perceived social isolation and cognition. *Trends in Cognitive Sciences*, 13(10), 447-454.

Carnevale, J.B. & Hatak, I. (2020). Employee adjustment and well-being in the era of COVID-19: Implications for human resource management. *Journal of Business Research*, August 2020, 116, 183–187.

Clark, D. (1997). Strategic Management Tool Usage: A Comparative Study. *Strategic Change*, *6*(7), 417–427.

Czarnitzki, F., Miller, D. & Reid, N. (2012). Building both technology-intensive and technology-limited clusters by emerging research universities: The Toledo example. *Applied Geography*, 34, 265-273.

Devece, C., Peris-Ortiz, M. & Rueda-Armengot, C. (2016). Entrepreneurship during economic crisis: Success factors and paths to failure. *Journal of Business Research*, *69*, 5366-5370.

Dieguez, T. (2021). Collective Approach and Best Practices to Develop Skills for the Post-COVID Era. In *Handbook of Research on Strategies and Interventions to Mitigate COVID-19 Impact on SMEs*, Ch. 2, 23-47. IGI Global.

Dieguez, T. (2017). Empowering Hub. In Handbook of Knowledge Integration Strategies for Entrepreneurship and Sustainability, Ch. 16, 256-284. IGI Global.

Donthu, N. & Gustafsson, A. (2020). Effects of COVID-19 on business and research. *Journal of Business Research*, *117*, September 2020, 284-289.

Etzkowitz, H. & Leydesdorff, L. (2000). The dynamics of innovation: from National Systems and "Mode 2" to a Triple Helix of university–industry–government relations. *Research Policy*, *29*(2), 109-123.

Ernest, K., Matthew, S. K. & Samuel, A. K. (2015). Towards Entrepreneurial Learning Competencies: The Perspective of Built Environment Students. *Higher Education Studies*, *5*(1), 20-30.

Gunn, R. & Williams, W. (2007). Strategic tools: an empirical investigation into strategy in practice in the UK. *Strategic Change*, *16*(5), 201-216.

Hadad, S. (2017). Knowledge economy: Characteristics and dimensions. *Management dynamics in the Knowledge economy*, *5*(2), 203-225.

Hillmann, J. & Guenther, E. (2021). Organizational resilience: a valuable construct for management research?. *International Journal of Management Reviews*, 23(1), 7-44.

Jacobides, M.G. (2010). Strategy tools for a shifting landscape. *Harvard Business Review*, 88(1), 76-84.

Lans, T., Blok, V. & Wesselink, R. (2014). Learning apart and together: towards an integrated competence framework for sustainable entrepreneurship in higher education. *Journal of Cleaner Production*, 62, 37-47.

Leydesdorff, L., Rotolo, D. & de Nooy, W. (2013). Innovation as a nonlinear process, the scientometric perspective, and the specification of an 'innovation opportunities explorer'. *Technology Analysis & Strategic Management*, 25(6), 641-653.

Maritz, A., Perenyi, A., de Waal, G. & Buck, C. (2020). Entrepreneurship as the Unsung Hero during the Current COVID-19 Economic Crisis: Australian Perspectives. *Sustainability*, 12, 4612.

Obschonka, M., Stuetzer, M., Audretsch, D.B., Rentfrow, P.J., Potter, J. & Gosling, S.D. (2016). Macropsychological Factors Predict Regional Economic Resilience during a Major Economic Crisis. *Social Psychological and Personality Science*, 7, 95-104.

Messmann, G., Mulder, R.H. & Palonen, T. (2018). Vocational education teachers' personal network at school as a resource for innovative work behaviour. *Journal of Workplace Learning*, 30(3), 174–185.

Mintzberg. H. (1973). The Nature of Managerial Work. New York: Harper & Row.

Nickols, F. (2016). Strategy, strategic management, strategic planning and strategic thinking. *Management Journal*, 1(1), 4-7.

Nobre. D. (2016). Ferramentas Estratégicas em Uso: Uma investigação Prática às Empresas em Portugal. ISCTE Business School, Lisboa, Portugal.

Shu-Hsiang, C., Jaitip, N. & Ana, D. (2015). From vision to action – a strategic planning process model for open educational resources. Procedia - Social and Behavioral Sciences, 174, 3707-3714.

Tassabehji, R. & Isherwood, A. (2014). Management Use Strategic Tools for Innovating During Turbulent Times. *Strategic Change*, 23(1-2), 63-80.

Wright, R., Paroutis, S. & Blettner, D. (2013). How useful are the strategic tools we teach in the business schools? *Journal of management Studies*, 50(1), 92-125.