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Co-creative Value Enrichment – Demonstration Environments Leveraging Ideas to Market

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Abstract: Knowledge transfer between research and innovation is often a difficult endeavor in practice. Knowledge, expertise and inspiration do not seamlessly flow between organizations and, more importantly, between people, creating a knowledge gap from science to innovation and business. Knowledge Transfer Charter (KTC) provides a practical set of tools and processes aiming at increased dialogue and enrichment of innovative ideas to foster seed of novel concepts in their path towards real-life solutions and markets. KTC encourages innovators and companies jointly to co-create and co-innovate new technologies by taking advantage of hands-on demonstration environments and infrastructures as part of the knowledge transfer process. In this way, KTC provides a unique way to create new added value by bringing together various stakeholders having a common interest. KTC fosters innovations for the benefit all stakeholders and boosts unexploited ideas of ecosystem partners with an open innovation mindset while simultaneously leveraging ideas to market.

Keywords: Knowledge transfer; innovation; technology; maturity level; demonstration environment; co-creation

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1 Introduction

Problem to be addressed

United Nation's Sustainable Development Goals (SDG) as well as European Commission's recently published New Industrial Strategy for Europe and the European Green Deal are setting the high-level strategic framework for striving towards just, sustainable and socially fair world. (UN 2015; (COM(2020) 102 final; COM(2019) 640 final). To implement the associated inevitable transition, new creative and agile value-based innovation management methods must be introduced for practical use. Furthermore, redefinition of universities' role in this transformation process is a must.

Organizations' capability for disruptive innovations is narrowed by limitations in infrastructure, technology awareness and shared mindset and vision. Assessment of potential ideas is risky when decision making processes are built on outdated knowledge. In many companies, understanding of new technologies and their Technology Readiness Levels (TRL) combined with profound comprehension of their innovation and business potential at all levels of company organization structure is incomplete, especially at higher decision-making level. Therefore, practical hands-on demonstration of novel technologies to be considered for product and process development inside companies also to decision-makers can be an eye-opening occasion supporting them in their strategical decisions and identification of new business opportunities.

Goals and objectives of the approach

In this paper we present a co-creative innovation management approach Knowledge Transfer Charter (KTC) developed in Tampere University of Applied Sciences (TAMK) to bridge the Death Valley of idea phase post-it notes to concrete sustainable value-based innovation management outcomes. Technology capability demonstrations foster idea to innovation build-up by providing a realistic view of current maturity of technology in consideration to all participants of the KTC process. In addition, presence of expert knowledge already at idea phase is crucial for the problem solving and knowledge transfer to take place immediately.

Our approach provides the KTC participants both with general awareness of technology capability and specialist level knowledge. Our process enriches ideas with value and sustainability aspects by applying a set of pre-defined criteria. All this will decrease idea to innovation and 'go to market' timeline and guide innovations towards the Sustainable Development Goals (SDGs). Current maturity

demonstration will help the organizations to assess their own competence needs and ambition levels.

2 Setting the Scene

At European level, the three broad and ambitious goals of the EU research and innovation policy, namely Open Innovation, Open Science and Open to the World were set by Commissioner Carlos Moedas in 2015 (Directorate-General for Research and Innovation, 2016). Within the concept of Open innovation, there exists several policy initiatives, funding schemes and support services to stimulate and opening up the innovation process to all people contributing to the free circulation of knowledge, ultimately leading to new products, services and creation of new markets and more jobs. These include e.g. Knowledge and Innovation Communities and specific financial schemes such as the COSME programme targeted to innovators, entrepreneurs and SMEs across Europe.

Nevertheless, despite the ambitious goals set by the high-level polices, the gap between research and innovation is often profound and difficult to be bridged at practical level. Theories of knowledge transfer reach back to mid 1990's as Nonaka and Takeuchi presented their first models of knowledge-creating companies (Nonaka and Takeuchi, 1995). Profound university-industry collaboration is a distinctively European phenomenon, which offers huge potential to exploitation and commercialisation of innovations and related knowledge transfer. However, institutions often lack established processes how to manage and foster it in an efficient and agile way. Especially companies are starting to realise the benefits of collaborating with universities as a source of skilled and entrepreneurial talents, new business ideas and future-oriented innovation which can bring them competitive advantage. In addition, university-industry collaboration allows businesses, especially SMEs, more axis of freedom in exploring new, even unexpected opportunities by providing financial and human resources to undertake innovation in a systemic way (Davey et al., 2018).

Universities are no longer isolated islands to other society, and their collaboration with companies and working life requires more agile and co-creative operational models. Renewal and internationalization of universities necessitate productized service offer of up-to-date knowledge, skills and competences to be widely tailored to suit to the needs of different technology-related R&I projects. In this way, universities can genuinely contribute as experts in knowledge transfer processes adding true value in high-level project consortia. In addition, productized knowledge transfer offer adequately responds to the rapidly emerging new knowledge and skill needs arising in companies (Puurtinen and Pohjola, 2018). Providing innovation management support, co-creative value enrichment and new solutions for development challenges through hands on demonstration in real

testing environments enables an effective charter for knowledge transfer implementation.

Already Assink (2006) presents how favorable set of influencing factors e.g. systematic competence development, infrastructure availability and mindsets renewal especially management's technology awareness gap, are recognized bottlenecks to improves large organizations disruptive innovation capability, together with gap of market and technology trends knowledge used in decision and investment making process when funneling, and enriching by value-based criteria, the long list of potential ideas. Digitalization evolves, new tech opportunities for growth especially in the field of intelligent machine industry together with Industry 4.0 introduction becoming as standard expectation also from users not only B2B customers. (Assink, 2006)

3 Approach – Knowledge Transfer Charter

Universities' role as agents of regional innovation fostering and growth expeditors with open access infrastructure and multidisciplinary student innovation resource potential must be made true. To truly realize this ambition, new and fresh approaches to university-industry-public sector collaboration are needed. This requires research and innovation infrastructures of universities to be more efficiently utilized within the ecosystems and needs to be provided with enthusiastic innovation management approach.

Tampere University of Applied Sciences (TAMK) has taken active steps to gain this innovation agent role and sharing its recently invested Industry 4.0 infrastructure TAMK FieldLab as open test bed. TAMK FieldLab is a trial and learning environment enabling Industry 4.0 experiments responding to knowledge transfer challenges and better understanding of new technology opportunities in business. The TAMK FieldLab environment also aims to improve students' and other users' utilization of learning environments to increase added value of research and innovation endeavors. Expediting adaptation of merging technology and industry driven curriculum development offering agile innovation-centered talent building processes to become one of the recognized high-quality Tampere Region innovation centers.

New open learning environment with modern equipment and machines together with co-creative approach offer accelerated support for innovation and increase lifelong learning. Furthermore, it encourages innovation and experimentation which will lead to innovation and new business opportunities. Hence, TAMK FieldLab conducts research and innovation experiments and pilots to fulfill the needs of the labor market and business.

TAMK's innovation management approach bridges the Death Valley of idea phase post-it notes to concrete innovation with evaluable outcomes in a modularised Knowledge Transfer Charter (KTC) which can be customised. Our KTC approach is a productised model for competence and skills development process and it is considering different levels of technology maturity as well as participants' required expertise and awareness levels. Successful implementation of knowledge transfer requires understanding the level of current expertise of participants e.g. differing grades of awareness, user, master. Furthermore, technology maturity, e.g. Technology Readiness Level TRL, of demonstrated applications needs to be considered together with usage and applied timeframe from participant point of view. Properly implemented KTC stimulates competence and skills growth at each individual knowledge level of participating companies or organisations. Simultaneously, it reveals and enables the exploitation of future opportunities in business, applications and benefits in general.

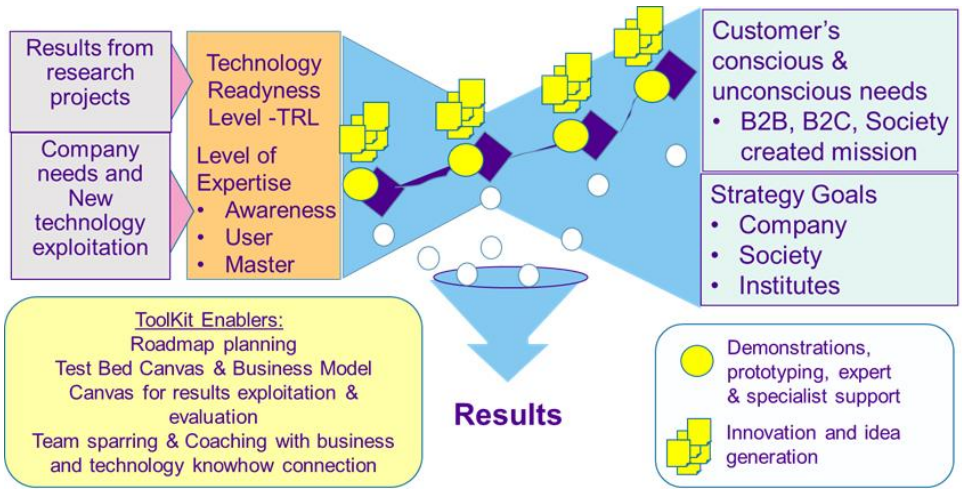

Figure 1 Knowledge Transfer Charter Approach

Knowledge Transfer Charter implementation requires infrastructure with technology capability demonstrations providing realistic view of current maturity of technology in consideration to all participants. Also, presence of expert knowledge already at idea phase is crucial. In this way, in-depth challenges can be solved while also knowledge transfer takes place immediately. KTC approach brings the participants both general awareness of technology capability via demos and specialist level knowledge interactive access via technology providers' physical presence. In addition, ideas are enriched with value and sustainability

aspects by applying a set of pre-defined criteria (e.g. sustainability, customer value, SDG) as described in the Knowledge Transfer Charter approach philosophy.

KTC can be utilised also as strategy development support for long-term roadmap development. Approach provides modulated and customised driver for innovation-based dissemination of early results as well as impact expansion often needed by research projects and innovation platforms.

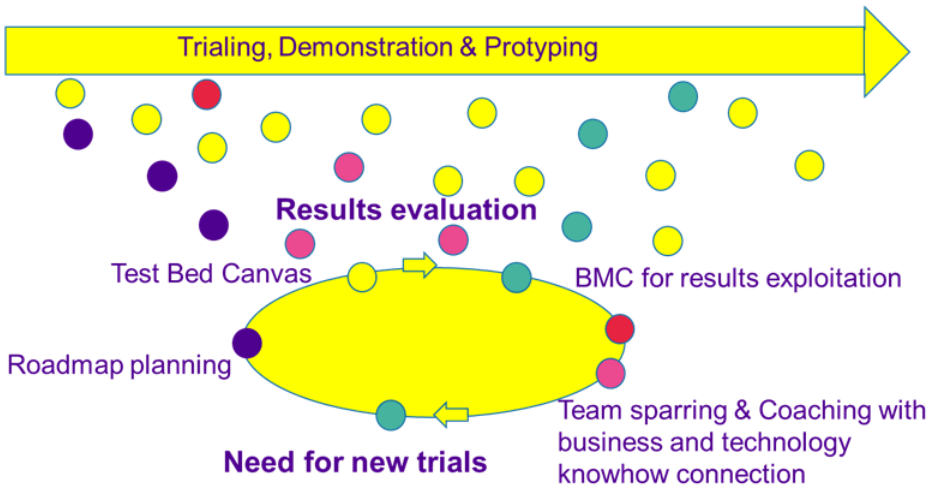

Figure 2 KTC Toolkit usage for idea creation and evaluation

KTC approach includes process descriptions, guidelines and description of a toolkit used during the transfer and development process. The toolkit includes various tools and methods such as Team sparring & Coaching with business and technology knowhow connection; Roadmap planning guidance; utilisation of Test Bed Canvas for test result analyses; Business Model Canvas for business value exploitation and opportunity identification as well as guidance for next trialling with connection of needed infrastructure and technology knowhow.

Applied innovation process includes multidisciplinary taskforces including students, industrial stakeholders and technology experts following Competence Growth Revival (CGR) process in shared genuine infrastructure (Puurtinen and Pohjola, 2019). Efficient use of KTC will decrease idea to innovation time and shorten the go to market steps. Furthermore, hands-on experiencing of current maturity demonstration will help organisations and companies to assess their own

competence needs and ambition levels, driving and encouraging them to reach the next level on innovation, competitiveness, growth and market share.

4 Results and Implications

Pilot cases of KTC experimentation show promising results on utilizing systematic, structured and managed approach on co-creative joint innovation processes between companies and university. A survey was conducted after one pilot innovation session. It was organized as joint sessions between several (6) companies and university students and formulized as a competition. Company teams complemented by university students selected one to five mechanical engineering innovation challenges to solve within 28 hours. University staff participated in supportive and management role only.

Results of the survey indicate that participants felt that the overall concept supported the innovation process very well. General feedback averaged to 4,85 of 5, and different questions are shown in Figure 3 below.

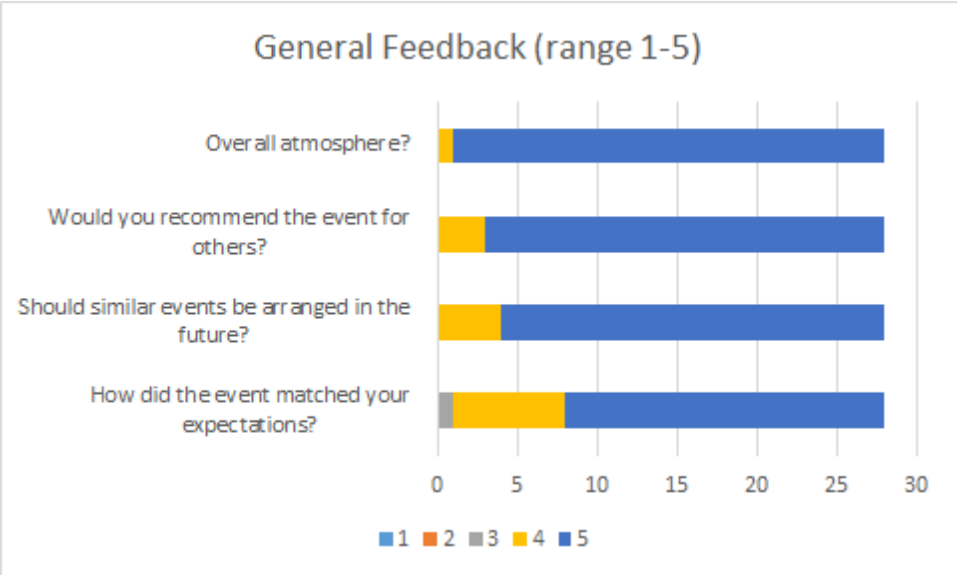

Figure 3 General feedback of the joint sessions between companies and universities.

Results also indicate that the arrangements for innovation support were highly valued. Figure 4 shows that even though all different questions show very good

results, the innovation facilities show most potential for improvement and room for more structured innovation process can be seen.

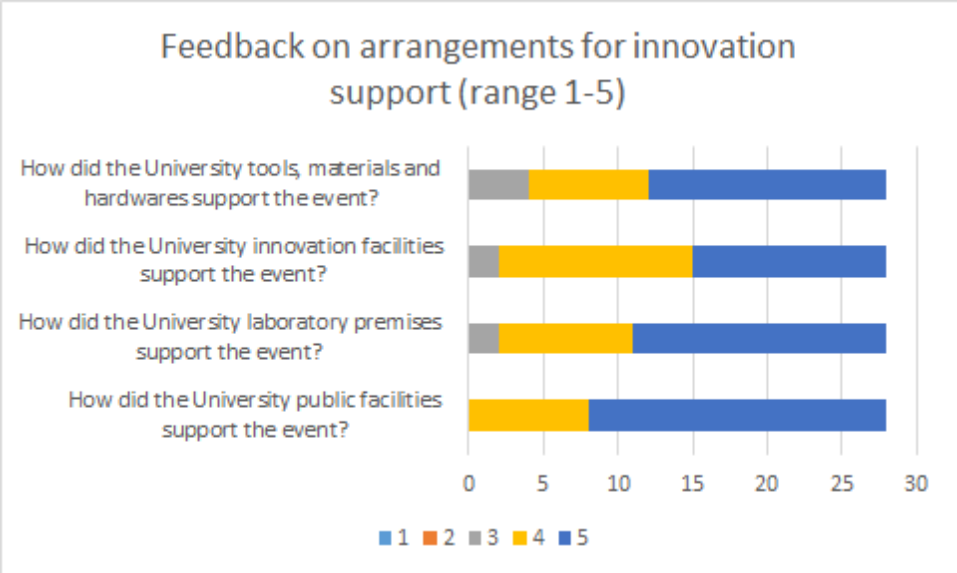

Figure 4 Feedback on arrangements for innovation support.

The innovation process outcomes were evaluated qualitatively. The outcomes brought up several novel solutions and R&D projects were launched to implement the results to company's product portfolio.

In the future, the goal is to grow the amount of valuable outputs of such events with the evolving KTC approach. Even though the events as such were organized with a structured manner, the teams had the freedom to choose their ways of working freely. Many know innovation methods were used, but evaluation of the early ideas and concepts was done only within each team. With KTC it is possible to foster the innovation process output by facilitating the cross-connections of the early outcomes and thus enable new findings from a set of ideas not looking valuable independently.

In the results of the survey it is notable that university premises and facilities were found to be very supportive for the innovation. Up-to-date facilities and laboratory environments are essential for providing education that meets the requirements of the industry, but there is lots of untapped potential that can be effectively released with a structured process like KTC. Growing utilization of the university facilities has positive effects on business opportunities of the university, and early

implications show that state-of-the art innovation environments combined with structured offerings on innovation fostering motivates companies to deepen their collaboration with the university. While the business environment of companies changes faster and faster, it is even more important that the companies can achieve the initial understanding about the technologies possibly valuable for their products and processes. In its final form, KTC will help organizations to screen their innovation landscape in a cost-effective way in faster pace compared to their competitors.

Productized innovation services can also have strong positive impacts on university's personnel knowledge and skills. As co-creative activities with companies become part of daily operations, inclusion of personnel can reach next level. In unformalized processes resourcing of employees, especially in teaching roles, can be very ineffective and even cause negative stress. This reduces the gains that company-university collaboration enables at the area of knowledge sharing and dissemination. By structured innovation process management, KTC can give positive impact on sharing latest working life and research information between business and universities.

As recent incidents show, it is coming inevitable for societies that knowledge transfer between actors on all sections of life works undisturbed in any conditions. Formalizing the ways we share knowledge and build innovations will support this target in several ways. As mentioned, managed innovation and knowledge transfer processes foster the knowledge flow from basic research to applied research and all the way to daily operations of companies. Leadtime from research to practice can be reduced with initiatives like KTC. It is also notable that working along pre-defined methodology trains both students and people in companies to work in a structured way, even in circumstances where familiar methods are not directly applicable to issue at hand.

5 Conclusions

As known, knowledge transfer between research and innovation is often a difficult endeavor in practice, yet TAMK's Knowledge Transfer Charter (KTC) approach, including practical set of tools and processes, creates a foundation for innovation build-up, trialling and results evaluation in modularised, facilitated and easy to understand and way that can be customised. KTC encourages innovators and companies jointly to co-create, co-innovate and develop new technologies by taking advantage of hands-on demonstration environments and infrastructures as part of the knowledge transfer process. Furthermore, hands-on demonstrations of technology maturity in real environment with open innovative mindset of all

participants is a vital element for co-creative value enrichment when leveraging ideas to market and seeking for new innovative business opportunities

We strongly believe that the Knowledge Transfer Charter can benefit innovation management community with high passion towards value-based, sustainable and responsible innovation topics. Our KTC approach provides an agile process for ideas to be simultaneously funneled to feasible business innovations and enrichened with value and sustainability requirements. Co-creative pilots of the approach are currently implemented with companies to validate the added business value. Therefore, the final beneficiaries of implementing the approach are industry and especially SMEs who gain knowledge on how to enhance the speed from innovation to value based business. In addition, universities increase their efficiency in innovation process, improve dialogue with the industry to facilitate knowledge transfer and increase their agility to respond to the needs of the industry.

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