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Development of value proposition to promote green innovation for sustainable organizational development

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ABSTRACT

From literature survey, it is noticed that there is substantial gap to a methodology that supports to identify and develop a generic value proposition framework as necessary to promote green innovation. To fulfill such gap, this study identifies and proposes a methodology to develop a value proposition framework that concerns the essential value creation activities as necessary to promote green innovation in any region or a country. The methodology of this study is based on an exploratory literature review and experts' opinions from two intertwined workshops, where the participants were highly knowledgeable in green innovation and green mindset/culture. The created value proposition framework is analyzed and validated based on different organizational categories such as small and medium enterprises (SMEs), larger corporations, expert organizations, higher education institutions (HEIs), and vocational education and training (VET) institutions. The study findings will help organizations to contribute to new knowledge creation within industry practitioners and fellow researchers to develop a value proposition framework to foster green innovation. This article is concluded concerning managerial perspectives along with study limitations and future research.

1. Introduction

Organizations are under pressure to minimize their impact on climate change: firms want their performance and product to be more environmentally friendly as customers nowadays are more aware of the impact their behavior has on the environment and society (Merli et al., 2019). From this perspective, firms need to integrate green initiatives and programs into their operations. This has led to the concept of green innovation (GI) and has become an integral part of many industrial sectors. The focus of product and service innovations is to improve company offerings and increase value for customers, while process innovations have resulted in the cost-efficiency and flexibility of organisational processes (Zheng et al., 2023). As both types of innovations can contribute to the development of more sustainable societies, organizations and businesses, GI has been considered a tool for both sustainable development and competitive business advantage. The idea and practice of sustainable development can be defined as a guiding institutional principle, as a specific policy objective, and as the subject of political conflict that addresses the various problems of our new global context (Ching et al., 2022). It emphasizes what should be sustained, what should be developed, how to integrate environment and economic development, and for how long to fulfill the unmet needs of future generations (Moreno-Monsalve et al., 2023). Additionally, Takalo et al. (2021) have defined green innovation as "a process that contributes to the creation of new production and technologies to reduce environmental risks, like pollution and negative consequences of resource exploitation".

Environmental issues have become more important to companies due to tightening environmental laws and regulations but also due to greater stakeholders' demands. Governmental institutions offer incentives to foster companies to decrease their negative environmental impact and to improve their environmental performance by meeting

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international agreements (Soewarno et al., 2019) and promoting green innovation (Aron and Molina, 2020). Implementation of a green innovation strategy in organizations indicates their seriousness and commitment towards social responsibility by improving their environmental performances (Cronin et al., 2011) and satisfying the government's environmental rules and regulations (Ma et al., 2017). While green innovation is considered an important factor in responding to current environmental challenges, it can also lead organizations toward sustainable competitive advantage, better market position and better business profitability in a long run. Because of the benefits green innovation may bring, GI has become an important tool for managers.

According to Chan (2011), green innovation is a particular type of innovation enabling improvements in corporate image, developing new markets and extends competitive advantage while satisfying stakeholders' environmental concerns. Furthermore, Leenders and Candra (2013) describe green innovation as product or process innovation dealing with technological development for preventing pollution and waste procession, energy efficiency, recycling and eco-efficient design. Environmentally sustainable innovations are capable of reducing organizations' environmental footprint by embracing strategic shifts, product design methods, productive processes, efficient use of resources (Hashim et al., 2015) and waste treatment procedures (Newaz and Appolloni, 2023).

Studies highlight the important role of organisational capabilities in generating green innovation, which is seen as more complex compared to more conventional technologies and innovations. Companies need to include environmental impact as one of the key factors in their development processes requiring invest in R&D, a higher share of highly educated employees and invest in the training of employees. As stated by Østergaard et al. (2021), employees are considered key contributors to the organisational innovation process as both knowledge and learning are the main input to innovation. They both are linked to employees: Employees create internal knowledge applied in innovation processes. They also determine the organizations ability to exploit external knowledge.

To promote green innovation, it is necessary to identify and develop the necessary skills gap. To fulfill such skills gap, companies need to cooperate closely with educational institutions such as general universities, universities of applied sciences, secondary level vocational education and training (VET), etc., that provide required education and training for green skills development for promoting green and sustainable innovation. In addition, various companies in a region or country can collaborate with educational institutions to provide practical cases and practical learning experiences in real working-life contexts and share best practices that foster green innovation. In addition, there also a need for re-skilling up-skilling the existing workforce to promote green innovation.

This paper is linked with GREENOVET project aiming to develop green skills for working-life promoting green innovation aligned with regional smart specialization strategies (S3) for green transition and carbon neutral region. Supporting the sustainable development of green skills for regional needs it is considered important to understand the value for the stakeholders that educational institutions can co-create together with the other actors in the region. As value proposition thinking is very fundamental for the value-focused organisation (Äyväri and Jyrämä, 2015), it is necessary to analyze the value proposition and value co-creation. Concerning the green innovation perspective. Though contemporary literature has recognised a linkage between sustainable or green innovation and value proposition design (Baldassare et al., 2017), sustainable business modeling (Bocken et al., 2014) and value c-creation (Yousaf, 2021), there are fewer examples of value proposition design in the context of developing educational services for promoting green transition and green innovation in the region.

Such an analysis will help organizations to establish a bottom-up approach strategy to matchmaking the value creation in terms of adopting green innovation. Along with skills development, it is, therefore, very much important to study and measure the value proposition and value-co-creation concerning green innovation and identify relevant benefits and potential challenges. Based on the above-related needs and strategies, this study identifies two research objectives that will be fulfilled within the scope of this study and can be stated as follows:

RO 1: To identify the needs and strategies to create a value proposition in an organization to foster green innovation.

RO 2: To study the accompanying limitations and challenges to create a value proposition in an organization to promote green innovation.

The rest of the article is organised as follows: Section 2 outlines the literature review, where the basics of green innovation and sustainable innovation are discussed for organizational development. The study methodology is highlighted in Section 3, whereas, overall study outcomes from the two workshops are illustrated in Section 4. Managerial implications are described in Section 5. This article is concluded in Section 6 along with study limitations and several future study directions.

2. Literature review

2.1. Green innovation for enhanced customer value

Innovation can be defined as the implementation of an idea resulting in the introduction of a new or improved product, process, or service (Bessant and Tidd, 2007). In an organization, innovation practices can be performed about products, services, operations, processes, and people (Summad et al., 2023). The concept of defining the sorts of green innovation that minimize harmful environmental consequences is still elusive and lacks a common nomenclature within academia. Over 20 years, even though the topic of environmental sustainability (Nazarian et al., 2023) and innovation has grown in importance among scholars, the words 'green', 'eco', 'environmental', 'ecological', and 'sustainable' are often used synonymously in the literature to describe the same occurrence (Janahi et al., 2021; Oduro et al., 2022). The word "green innovation" has been used more frequently recently in environmental management and policy, albeit in a variety of circumstances and with many underlying implications that may eventually lessen its usefulness. Many different types of the invention can be categorized as green innovations because the definitions of green innovation appear to be fairly broad. This brings up the crucial question of further categorizing green innovations to comprehend their unique qualities. Green innovations may be a useful instrument for setting up the system for generating new ideas and identifying value-adding activities following the structure of the economic unit.

In academic literature, green innovation is defined as a subset of innovation and it shares many characteristics similar to general innovation considering environmental management and policy (Wagner, 2008). It is helping to renovate the entire innovation system while considering social, ecological, and economic factors. The ability of economically-feasible and environmentally-friendly technologies supports to develop and maintain sustainable economic practices that do not prioritize short-term value creation above long-term wealth is essential to its long-term survival (Rath et al., 2021). It is hoped to demonstrate the variety of ways in which green innovation processes can lead to improvements in the economy and the environment. To promote green innovation, it is critical to identify the various green innovation dimensions, demonstrate their diversity, and discuss both their process-oriented and outcome-oriented impacts. Process, product, and organizational practices are considered three major dimensions connected with the notion of green innovation.

The rewards that the inventor receives have a significant impact on how green innovations are generated. Successful green innovations must improve value or decrease expenses and, in the end, either raise revenues from current customers or draw in new ones. The process of green

innovation and its effects on the environment, however, can be greatly influenced by how businesses add value to their goods, processes, and services (Fontoura and Coelho, 2022). The concept of green product service and how it is delivered to customers must be redefined for product service innovation to be radical (Suasana and Ekawati, 2018). It is suggested that by deploying a green product service system, it is necessary to create sustainable business strategies, which provide goods, services, infrastructure, and networks that are intended to be competitive, meet customer wants, and be less harmful to the environment than traditional economic models (Goedkoop et al., 1999).

2.2. Value co-creation for sustainable green innovation

Organizations have been urged to green their manufacturing, distribution, and goods for many years as a strategic move that will benefit both them and society in terms of the environment and the economy (Unruh and Ettenson, 2010). A multi-stakeholder approach that considers both the demand-side (i.e., end-users) and supply-side (i.e., suppliers, manufacturers, and distributors) is necessary for the evolution of green innovation prospects (Enflo et al., 2008). Value-chain analysis in green innovation typically concentrates on the financial effects of all aspects of operations, marketing, and sales activities on the costs and competitiveness of a company's products or services. As a result of its potential impact on the economic unit's position in the market, the element of green innovation is one of the crucial factors that economic units must consider. New and quick improvements in the goods or services are therefore seen as a competitive advantage of green innovation. To create a pure and appropriate atmosphere of green innovation and to produce high-quality products or services, companies should be able to produce products or services free of any manufacturing waste.

The issue of sustainability in green innovation is gaining significant momentum among government institutions, policymakers, researchers, and industries (Howard-Grenville et al., 2019; Saunila et al., 2018). Moreover, increasing awareness of society to find a solution for the economic and socio-environmental crisis through a more sustainable lifestyle has led to the idea of sustainable green innovation (Dyck and Silvestre, 2018). Quite often, green innovation and sustainability have been studied separately; however, a plethora of scopes exist to research these two important terminologies in their integrated form (Khurana et al., 2021). Several studies have highlighted the expanding significance of cooperative relationships in the advancement of systemic green solutions. The evolutionary innovation within the value system of well-known business partners is highlighted to adopt and scale up environmental practices, processes, and methodologies. Sustainable green innovation is the introduction of something new or modification in the existing product, process, or system such that it improves the three pillars (ecological, economic, and social) of sustainability. The modification may also be in terms of business models, organizational values, and managerial practices (Adams et al., 2016).

The involvement of customers must promote green innovation with added benefits. Green innovation often can be costly due to abiding by several strict environmental restrictions imposed by the government of a country (Olson, 2014). From such a perspective, products or process designers need to cooperate closely with the end customers by knowing their potential wishes to buy those products or processes despite the extra cost than the traditional innovation processes. Customers' involvement is then bringing fruitful co-creation of products or processes that follows innovation in a greener way. These co-creation activities also reduce the risk of products or process failures due to the potential customers' involvement and commitment from their total life cycle, from raw material extraction to final use and disposal. Green innovation offers an ability to bring environmental advantages like increased human health and biodiversity and contributes to a broader perspective by incorporating the financial focus of value chain analysis. The life cycle analysis of green products or processes is a multi-stakeholder approach, which frequently misses the financial implications of the targeted technologies used due to its concentration on environmental effects.

3. Study methodology

3.1. Research design

This study outcomes were mainly based on the implementation of a project named with 'GREENOVET', project (https://www.GREENOVET.eu/), co-funded by the European Commission Erasmus+ programme. The aim of this project is to foster the development of Vocational Education and Training (VET) Excellence in Green Innovations across Europe. The outcome from this project helps to develop education capacities and capabilities and regional competence in green innovation. Moreover, this project aims to establish a Center of Vocational Excellence (CoVE) in the region of Vaasa in Finland that supports the promotion of green innovation in the region. The CoVE will support the VET education and training to upskill and reskill the local workforce in close collaboration with the regional stakeholders and contributes to regional development by establishing and green skills ecosystem.

The used methodology in this study is based on the *theory of value co-creation* (Prahalad and Ramaswamy, 2000), developed within the service science (Ostrom et al., 2010). Value co-creation is understood as a joint, collaborative, concurrent and peer-like process allowing organizations and their customers to create new value in collaboration through interactive activities. Co-creation of value is seen as providing benefits for the whole value network, such as improving usage experiences and or stimulating product and service innovation. From the co-creation perspective, new business opportunities are developed together in co-creation, where different viewpoints are identified and taken into consideration as a starting point for ideation and further development of value proposition (Vorbach et al., 2019).

3.2. Data collection through two empirical workshops

The study objectives are addressed though a qualitative research approach applying co-creation methodology in the context of value proposition design promoting green innovation. When experimenting with the planned process and tools for value proposition design, two workshops were arranged within the scope of the GREENOVET project. To fulfill the overall study objectives, the participants of the workshops were grouped based on the organization types (e.g. larger corporations, SMEs, HEI/VET institutions and regional expert organizations) to discuss the issues related to the value proposition for green innovation. These co-creation workshops were conducted to develop value proposition canvases within multiple business organizations in the Vaasa region, Finland involved in the green initiative. The first workshop was concentrated to develop a business canvas necessary to promote green initiative, while the second workshop focused on the development of a value proposition framework. Both the workshops are elaborated in the following sub-sections.

3.2.1. First internal pilot workshop to develop a business canvas to promote green innovation

The first internal workshop was organized with the project partners, which was considered an internal pilot case of the project. In this workshop, the Delphi method was used, where in total eight experts attended (6 physically and 2 online). Among eight participants, six were experienced professors from various educational institutions (universities and VET institutions) and two were experienced experts from technology centers engaged in promoting local industrialization concerning improved efficiency and environmentally friendly. Participants of the workshop represented multi-stakeholder views with background and experience in different fields of expertise including engineering science, business management, education science and design. The internal workshop aimed to generate insights and map especially the

current partners and resources available from the service provider viewpoint as well to identify opportunities for value creation for green skills development required in the working life in the region.

During this internal pilot workshop, a hand-drawn Business Model Canvas (Ojasalo and Ojasalo, 2018) was placed on the wall, which was filled in by the eight experts with sticky notes. The experts individually analyzed their organizations concerning key partners, key resources, cost structure, value proposition, etc. The key partners were divided into four categories such as regional partners network, national partners network, educational/research networks, and related projects network, whereas, the key resources were categorized as various offered courses, study skills, available laboratories, platforms, services, and funding opportunities. Each of the answers came from the experts based on their perceptions and expertise, and no answers were discarded. In the end, the outcomes from this internal workshop served as the base for the second workshop, where various regional stakeholders (companies and academic institutions) and members of the project's Regional Committee (RC) were invited to participate.

3.2.2. *Second workshop: value proposition for green innovation*

The second workshop was designed to develop a value proposition that fosters green innovation. This workshop was organized with the participation of sixteen GREENOVET project's regional council (RC) members. A multi-stakeholder viewpoint was secured as the workshop participants were representing SMEs, large corporations, HEIs and VET schools, expert organizations, and regional authorities engaged in the top and medium management levels in their corresponding organizations with working experiences of more than 10 years in general. were engaged to create and analyze the project's value proposition following the Service Logic Business Model Canvas (Ojasalo and Ojasalo, 2018).

The key objective of the second workshop was to gather information from the region to generate a more in-depth understanding of the motives, needs, desires and fears different groups of stakeholders may have in their lives, at school and work in the context of green transition and green skills provision. The service design methodology and tools were used to set the context for the co-creation activities and to emphasize with customers, as participants were given a pre-task. Firstly, they were asked to think about the most important factors driving the change in the regional operation environment and the challenges they will face. Secondly, they were asked "step into the shoes" of one selected person representing one occupational role in their organization.

In this workshop participants were split into four different groups representing (i) SMEs, (ii) Large companies, (iii) Higher Education Institutions (HEI), and Vocational Education and Training (VET) schools and (iv) Expert organizations and regional authorities. In each group, there was one participant from the main project team whose task was not to get involved with the discussion but to focus on active listening to the discussion and facilitating the planned activities.

Participants had a chance to share their experiences and enlarge their views in their specific organizational context concerning green transformation and green innovation when discussing with their peers. This workshop aims to review and share what each organization needs and challenges concerning adopting green innovation and practices. Such valuable information can be collected and visually presented over the Value Proposition Canvas (Osterwalder et al., 2014). The objective of using the Value Proposition Canvas is to ensure products and services that match the customers' needs as shown in Fig. 1.

The value proposition map also describes how a company or organization creates value for its customers by providing improved products or services. Such values for customers are created after overcoming the existing challenges of the organizations. This value proposition is consisted of products & services, pain removers, and gain initiators and is integrated with the customer segment, where the interaction between them contributes to mutual benefits. The customer segment consists of customer needs, pains, and gains. The customer needs section collects the necessary needs from the potential customers and groups them as a customer segment. In this segment, all the customers have the same needs that they are trying to fulfill. In case of pains under the customer segmentation canvas, the customers express their challenges and unfulfilled expectations, possible risks, etc., which were not met. On the other hand, in the gains section, the customers express their opportunities, wishes, cost benefits, empathy, etc., which they achieved successfully. During this workshop, each stakeholder groups develops one Value Proposition Canvas. The canvases were developed by populating them by the workshop participants viewpoints as presented with the sticky notes, while the discussions were guided by the workshop facilitators.

4. Study outcomes

The first research objective was to identify the needs and strategies to create a value proposition. The value proposition is one of the multiple interrelated elements in any business model design covering both markets, offering, and operational and managerial viewpoints (Nenonen and Storbacka, 2009) needed when developing products and services promoting green innovation. The question was addressed when mapping the current operating environment supported by the Service-logic business model canvas (Ojasalo and Ojasalo, 2015, 2018) as a framework emphasizing the importance of deep customer understanding and customer value. While the business model canvas helps to identify and create value for own business, the value proposition canvas helps to identify and create value for customers (Osterwalder et al., 2014). For efficient value co-creation, both internal fits with all business model elements and the external fit between the provider's and customer's

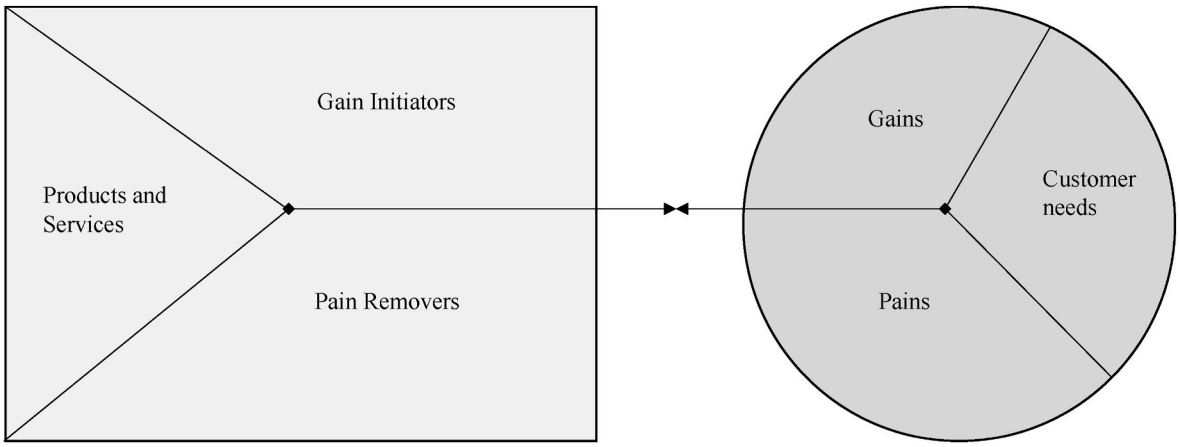

Fig. 1. Value proposition canvas (adapted from Osterwalder et al., 2014).

business models are necessary (Nenonen and Storbacka, 2009).

The second research objective was to study the accompanying limitations and challenges to creating a value proposition in an organisation to promote green innovation. The question was addressed by experimenting user-centric value co-creation approach for mapping value and ideating new opportunities for value in practical settings together with regional stakeholders and getting inputs from the participants in the second workshop. The results of the study are explained in more detail in the coming sub-sections.

4.1. Mapping the current operating environment

The aim of the first workshop implemented with the members of 4 internal project partner organizations was to generate a better understanding of the opportunities for value co-creation for the region while supporting the development of necessary skills for the green transition and green innovation. Instead of focusing on the organisational boundaries, the value is co-created between various actors within the networked environment. This leads to managerial challenges of co-creating value in the network (Nenonen and Storbacka, 2009).

As the Service logic business model canvas (Ojasalo and Ojasalo, 2015, 2018) was used as a tool for mapping the current operating environment of the partner organizations, partners were asked to provide information from their organisation viewpoint for the building blocks of the business model canvas, namely key partners, key material and immaterial resources, current products and services provided, customers and benefits provided for them. Business model canvas provides a relatively simple framework (Osterwalder et al., 2014) supporting visualization, richer communication and more creative exploration of actors, resources and activities, organizational strengths, capabilities, and opportunities. In the workshop especially, the left side of the business model canvas was emphasised. Mapping the status quo of the partner organizations by using sticky notes on the wall helped all partners to build a more holistic picture of how their existing elements of the business model canvas are interconnected within partner organizations and how they could be connected within stakeholder networks (Joyce and Paquin, 2016) in the region to generate better value in the context of green transition and green innovation.

When participants of the workshop were mapping the current operating environment and capacity to foster green transition and green innovation, specific “green lenses” were adopted. For instance, identified necessary skills available were expertise in innovation management, project management, marketing and communications, future foresight, pedagogics, sustainable business and green technologies, etc. Similarly, for key resources available participants mapped their current immaterial and material resources related to teaching, research and development applied in existing education departments of partner organizations including laboratories, research platforms and workshops. For the key partners’ category on the canvas, participants identified current national and international projects, regional, national and international networks, local/regional authorities, other educational institutions, etc. Also, various potential sources for revenue streams including project funding opportunities were listed as necessary to execute the value-creation activities.

As project partners were not necessarily familiar with all material and immaterial resources provided by other partner organizations, using BMC as a framework was useful for mapping the existing elements and features for seeing the “bigger picture”. It provided a fruitful starting point to look for synergies and new opportunities for value co-creation, and for developing a more sustainable strategy and business model for the Center of Excellence in Green Innovation.

4.2. Profiling target customer groups

In total 16 regional committee members of the project were participating in the second workshop. They represented working life, e.g. business organizations, educational institutions and regional development organizations. The main aim of the second workshop was to create a better understanding of stakeholders’ needs, values and expectations for skills development in the context of green transition and green innovation for value co-creation. The value proposition is an important element of any business model. Organizations need to be able to identify how they can support customers to perform specific jobs that no other alternative offering can address. Value proposition innovation can serve as a starting point for any business model transformation (He and Ortiz, 2021.).

Osterwalder’s Value Proposition Canvas (Osterwalder et al., 2014) was used as a framework for value mapping and co-creation reflecting the right side of the business model canvas as the three blocks of the left side are associated with customers and value. Customer demand is considered the core element of the value proposition, while value proposition is the core element of the business model defined in Business Model Canvas (Osterwalder et al., 2014; Ojasalo and Ojasalo, 2015). Value proposition canvas as an extension to BMC helps to align the value proposition of the offering with the customer needs and expectations for a better fit in the market. With a holistic understanding of the customer’s desires, values and needs as a starting point for value proposition design, there is a better opportunity to understand the “right” problem and satisfy the customer’s expectations. Deep customer understanding as a starting point for value co-creation can reduce the chance of failure in the market.

All workshop participants were divided into four sub-groups based on their organizational categories which were (a) SMEs, (b) Large companies, (c) Higher Education Institutions (HEI) and Vocational Education and Training (VET) schools, and (d) Expert organizations and regional authorities representing potentially different viewpoints on skills development. For each of the four sub-groups, there was one facilitator from the project team observing and supporting the discussion and implementation of co-creation activities as planned, not participating in discussions directly.

The process of identifying the value co-creation opportunities is based on an in-depth understanding of the diversity of user needs, wants and requirements referring to empathy in the design thinking approach. The key question was to understand the functional, societal and emotional needs of the workforce in a specific occupational context (representing the customer viewpoint) in the context of green transition and green innovation. Deep customer understanding provides a fruitful starting point for value proposition design based on the needs, values and expectations identified. The participants divided into sub-groups were considered experts in their field, thus being able to identify the current challenges for the green transition when reflecting on their specific experiences in their business context. When sharing their experiences with their peers, the discussion was potentially leading to new insights. The customer profile canvas provided a structured framework to observe the key characteristics of the customer segment in more detail.

After short group discussions, all four gups were asked to select and nominate one more detailed target group representing some occupational context relevant to the participants in the sub-group. The partners were asked to share their views and experiences with their peers for mapping the key factors of the selected customer profile reflecting their selected context. Customer profile breaks the customer down into its jobs-to be done, pains and gains (Osterwalder et al., 2014). Mapping the customer profile for customer requirements was supported with questions concerning green skills and green transition such as: *What functional and social tasks the customer is trying to perform in the job? What emotional needs are related to these tasks? What makes it difficult to reach the expected goals/implement the activities in practice? What is considered important but not possible to implement within a job in relation to green transition? What are the personal goals and functional, social and emotional gains that customer wants to achieve in the job?*

As a result, four different customer profiles were drafted reflecting 4

different organizational contexts, explained later in more detail. i.e. SMEs, large corporations, expert organizations and educational institutions. The illustrated customer profiles were representing different customer groups/occupations: 1.) blue-collar workers for services, construction, production, and maintenance, 2.) engineers and development experts, 3.) regional experts as promoters, and 4.) immigrant VET students.

One of the key objectives of this brainstorming session was to find out a common policy initiative of the organizations concerning the corresponding factors of the customer segments and their most important requirements identified that would support the further value proposition design. Mapping the customer requirements from different perspectives was also considered helpful for the participating stakeholders to better understand and prepare for successful skills development for green transition and adoption of green initiatives.

4.3. Mapping potential value propositions

After the customer profiling activity, all four groups were asked to continue discussions with their peers and to draft a list of the possible offerings that would possibly solve the customer's problem(s) identified when meeting the customer's requirements recognised. A bundle of products and services can help customers to perform their occupational roles and to complete either functional, social or emotional jobs or to satisfy their basic needs concerning their occupational roles in the context of green skills and green transformation. As products and services do not create value alone, but only concerning a specific customer segment, their jobs, pains and gains (Osterwalder et al., 2014) and through interaction and co-production (Ojasalo and Ojasalo, 2015), the four sub-groups focused on working with four value maps concerning their specific context represented.

Participants were asked to ideate together with their peers as many solutions as possible: as gain creators, pain relievers or as new products and services supporting the jobs-to-be done for their defined customer profile in the context of green skills and a green transition, and capture their key insights and ideas on value map as sticky notes. Ideas were generated based on group discussions where the participants were able to share their best examples or generate new ideas that would address customer jobs, pains and gains. The discussion provided a chance for self-reflection of the participants' organizations concerning their current corresponding products and services provided at the moment, various aspects they are using as gain creators and different ways to relieve or minimize their pains. But also finding new opportunities for synergies and solutions in co-creation. Generated ideas were written down on sticky notes and posted to canvas, where the evolving ideas were able to be seen with one sight leading to possible new ideas or iterations.

After brainstorming value proposition ideas, all sub-groups were asked to present their results and share their ideas for customer profiles and value maps (Figs. 2–5) with other groups. All groups were asked to switch places and look at the canvases drafted by other sub-groups. These group presentations were supported by the "learning café": facilitators of all sub-group presented the results while other participants in sub-groups were rotating from one canvas to another, one group at a time. After each presentation workshop participants were asked to vote for the three best ideas by giving color-coded stickers to those value propositions they considered most interesting and useful to be further developed. The voting exercise was considered an efficient way to identify key ideas valuable for stakeholders and to see possible similarities and differences among different stakeholder groups at one sight. Sharing experiences and ideas between participants and groups led to further discussion with new potential ideas.

4.4. Resulting value proposition canvases

As a result, four value proposition canvases were drafted representing different target groups and organizational contexts:

4.4.1. Value propositions for blue-collar workers

Fig. 2 below displays the value proposition canvas created by participants representing SMEs. The target group defined is representing entrepreneurs and blue-collar workers in the field of service, construction, and manufacturing businesses possibly with lower-level vocational degrees. While SMEs' were identifying industry-specific jobs, some of the challenges were considered common to multiple sectors for more sustainable business including energy efficiency, material optimisation and waste management reflecting expectations for carbon neutral society. Being able to overcome the challenges of transformation into a more sustainable company was considered to provide gains for the individual employees such as the meaningfulness of work but also for the company through better securing its' future existence when adopting a green and sustainable approach.

SMEs are struggling with finding enough employees that have the qualities and educational background needed due to overall competition of a talented workforce not only in the region but also nationally, and

Fig. 2. The value proposition canvas in the context of SMEs.

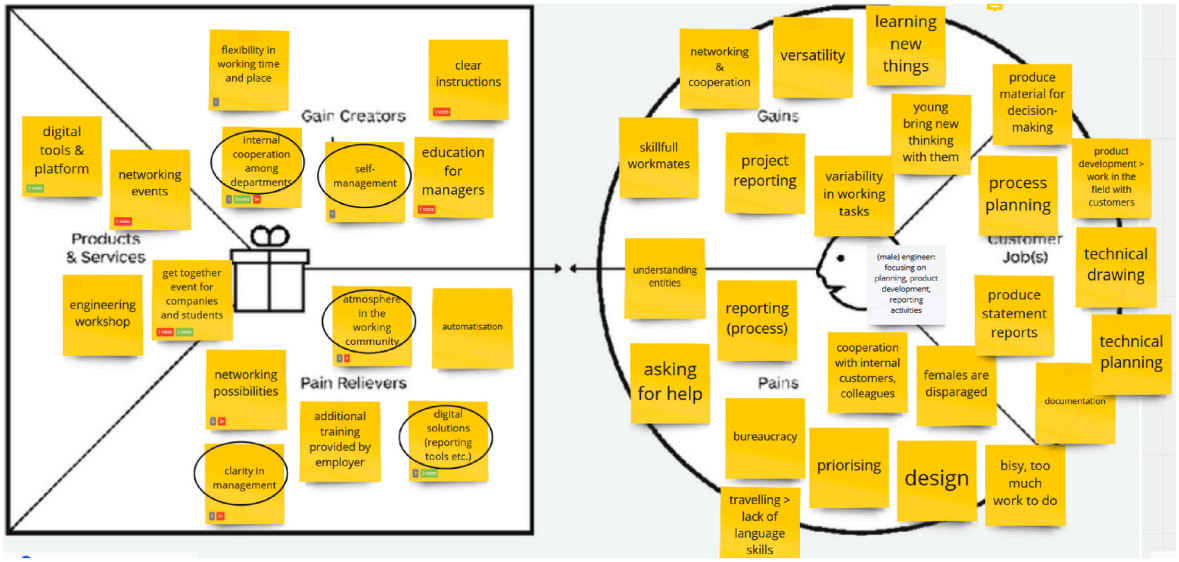

Fig. 3. The value proposition canvas in the context of large corporations.

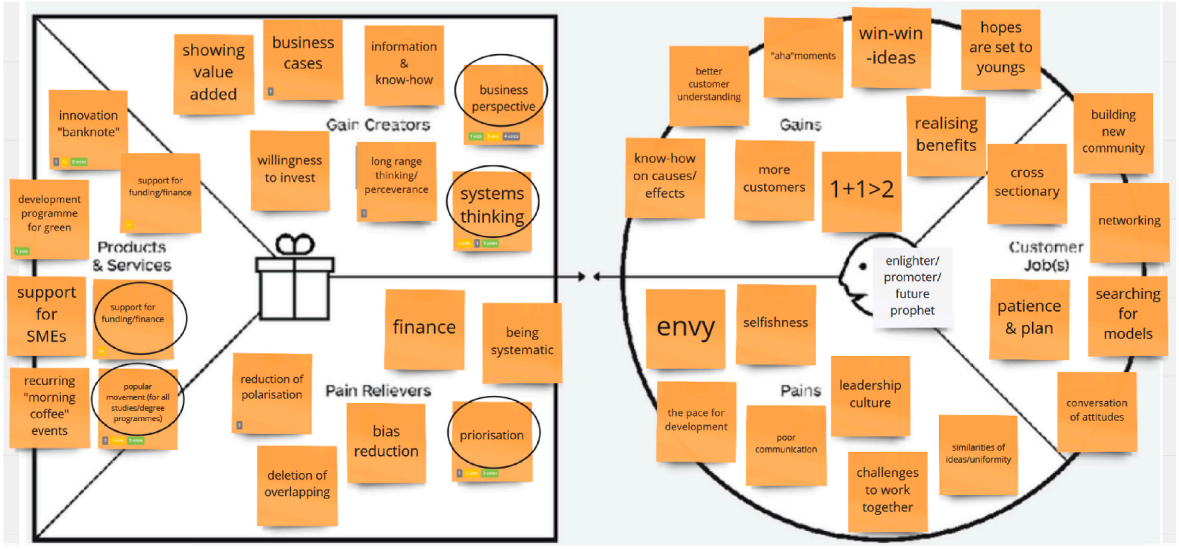

Fig. 4. The value proposition canvas in the context of expert organizations.

due to possible lack of attractiveness both with specific industries and to individual companies as employers' brands. Up-skilling and re-skilling are seen as the fastest way to meet the requirements for the skilled workforce supporting green transition. From the SMEs' viewpoint training just for specific technical skills is not enough but also training entrepreneurs on change management as well as a total shift in mindset is required. Employee attraction, satisfied customers and economically sustainable business are seen as important factors to secure the future business of the SMEs. Recognition of green and sustainable skills applied and visualised in the form of an "environment passport" would provide a differentiation advantage for the business. Adapting service design, common green thinking and industry 4.0 were seen as supporting the expected transition when providing tools to adapt to the required change in the companies. Entrepreneurial spirit and an ability to see opportunities for improvement are considered important for the future workforce.

4.4.2. *Value propositions for engineers and development experts*

Fig. 3 below displays the value proposition canvas created by the participants representing large corporations. The target customer profile defined is representing engineers and development experts, i.e. white-collar employees possible with a higher education degree. The challenges identified in the sub-group were related to processing planning, technical development and documentation and project reporting activities requiring general skills such as self-management, prioritizing, and internal cooperation. On an organisational level, better management skills are seen as a key to more efficient internal cooperation, less bureaucracy, a better atmosphere in the working community, clarity, and vision.

Solutions for overcoming the challenges acknowledged were the adaptation of digital tools and platforms, networking events, engineering workshops, etc. Participants from large corporations agreed that networking and cooperation are vital to the desired workforce. Though large companies are often on the "front line" developing new technical solutions to adapt to green transition, it was interesting to see that especially participants from large corporations did not highlight the green innovation skills specified but engineering skills in general.

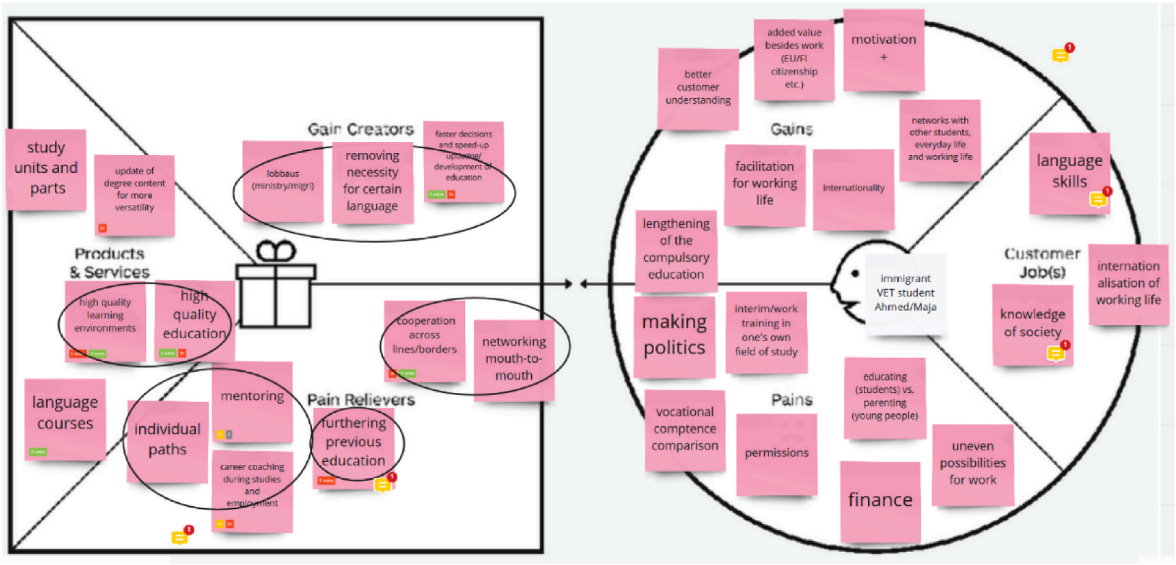

Fig. 5. The value proposition canvas in the context of educational institutions.

4.4.3. *Value propositions for regional development experts*

Fig. 4 below displays the value proposition canvas developed by representatives of the regional expert organizations. The target customer profile defined is representing regional experts as promotors, network and community builders searching for new models for the development. Challenges identified are much related to collaboration both at individual and community levels.

Establishing new initiatives requires both systems thinking and business perspective but also prioritisation. As expert organizations are focusing on regional development, they are often experts in looking for funding instruments for regional initiatives towards green transition, but also capable of supporting projects that will bring students/employees and companies/employers closer together for experimentation and to learn from each other. Due to continuous collaboration with companies in the region, expert organizations can create links between companies and educational institutions and look for more opportunities to expand the required knowledge and skills in the region.

4.4.4. *Value propositions for immigrant VET students*

Fig. 5 below displays the value proposition canvas developed by representatives of educational institutions for both upper secondary vocational education and training (VET) and higher education (HE). The immigrant VET student was profiled to represent the target customer. Within the target group the biggest challenges identified are more related to overall societal and regional circumstances, educational policies, structures, and current organization of VET education as well as students' capacity for educating themselves than to skills needed for green transition and green innovation. As solutions, high-quality education and learning environments as well as individual learning paths were emphasised. Due to the aging society, the number of students and workforce available is decreasing. Identifying and removing possible gaps for participating in and completing vocational education is key to securing the necessary amount of skilled workforce in the region in the future. Recognising the current and future needs for working life, both for SMEs and corporations in the region plays an important role when building high-quality learning experiences for skills development required for the green transition. Co-creation approach provides a better opportunity to understand and align different viewpoints.

Though the selected target profile was representing the upper secondary VET student, the need for developing continuing educational path into higher level education is important to acknowledge due to the continuously increasing amount of more demanding tasks in the working life. When collaborating, VET and HE institutions can build more meaningful and efficient study paths to meet the demands of the specific target groups and working life, while promoting long-life learning for green skills and innovation. Value mapping for other educational target groups including HE students and teachers for all vocational levels representing other key target groups was not possible within the scope of this study but would provide added value to the value co-creation process as a whole.

In a summary, seems that several companies participating in the workshop have relatively the same challenges when trying to acquire a workforce with relevant green skills to promote green innovation. Multiple value-creation opportunities were found in a relatively short time frame. Also, many of the drafted ideas for products and services have the potential to bring value to multiple consumer segments. Examples of suggestions include courses related to new technological possibilities, green thinking, change management, etc. On the other hand, seems that identifying the future requirements for skills development for the green transition in the companies is not always an easy task for stakeholders either.

5. Discussions and managerial implications

From the existing literature survey, it is noticed that although a substantial amount of research on green innovation has been conducted on its implementations in different organizations but few studies have been performed on the theme of value co-creation or value proposition from it. Additionally, it is also observed that there are few frameworks exits in literature that support eco-innovation, however, no study on specific value proposition framework is found that supports exclusively to promote green innovation. For instance, Yang et al. (2021) proposed a green innovation ecosystem, which is consisted of alliance within government, university and industry. Calvo et al. (2022) studied value proposition to improve energy efficiency through eco-innovations in SMEs. In a similar fashion, Ranta et al. (2020) developed customer value propositions in the circular economy perspective. A value proposition framework was put forth by Patala et al. (2016) that incorporates sustainability into the marketing and acquiring of technology-intensive offerings. Their methodology provides instructions on how to create sustainable value propositions that appeal to customers.

Moreover, current literature on green innovation referred to focus more on the explanation of the common context of green innovation and not necessarily on the methodological approach to explain how green

innovations are likely to be guided to create and support value from it. To fulfill such a research gap, this study presented a methodological approach to investigate how green innovation can foster value co-creation activities in various organizations of different sizes. To materialize the methodology, this study articulates two intertwined workshops that were aim to collect the necessary information related to value co-creation or proposition framework concerning the adoption of green innovation. A clear advantage of the methodology used was a cross industry-academic collaboration of people from different backgrounds and expertise. Participants involved in such collaboration were representing both academics and working life and responsibilities allowing a wide range of experiences, knowledge, interests and opinions to be shared during the two workshops. The diversity of the participants involved in the workshops supported the learning from each other, testing and developing new ideas.

While participants were expected to contribute to the value proposition design process, they were continuously able to provide feedback and validate the findings, results and ideas from their specific context. Another advantage of the used methodology was the possibility to validate the findings and results with multiple stakeholders immediately during the process, which offered a possibility to even more in-depth understanding what are the most important issues for the stakeholders to consider and whether there are similarities and differences with their expectations for value proposition. This provided a solid base for the further development of the value propositions. As new ideas were built up gradually, it was possible to look for feedback in multiple phases leading to a better understanding of the key elements of value propositions and providing building blocks for a more sustainable business model. Both workshops opened up several opportunities for re-skilling and up-skilling to promote green innovation in an organization.

The aim of the co-creation approach and design thinking methodology applied during workshops was utilise information from all relevant stakeholders to generate a better understanding of the necessary skills needed for promoting green innovation in the Vaasa region. Important benefits of design thinking stimulating the creative process and harmonising the variety of stakeholders' interests in the value mapping process (Geissdoerfer et al., 2016) were acknowledged within the workshop. Educational institutions, businesses and expert organizations were representing different viewpoints on skills development for the green transition and green innovation. The objective of the methodology was to encourage interaction and identify and ideate different forms of value opportunities for a high variety of stakeholders and to support the future development of strategy and sustainable business model for the Center of VET Excellence in Green Innovation. The methodology applied in the workshops was based on the co-creation approach and three basic steps of the design thinking process: (i) understand (ii) explore and (iii) materialize (Gibbons, 2016).

6. Conclusions, limitations, and future works

Due to rising public awareness, stricter environmental regulations, and increasing shareholder demand for environmental protection, environmental problems are becoming more and more crucial for manufacturing enterprises. On the supply side, major concerns for industrial enterprises include global warming, carbon emission restrictions, land degradation, and electricity shortages (Bendig et al., 2023). Customers' preferences are increasingly turning to more environmentally friendly products and services, which are less destructive or even beneficial to the natural environment (Janahi et al., 2021). To limit environmental damage, the government is monitoring and controlling the ecological repercussions of production activity. Environmental issues have consequently affected the innovation of industrial firms. Growing environmental awareness is altering the business climate and driving companies to pursue green innovation methods (Rath et al., 2021).

Although many industrial companies have acknowledged the concept of green innovation, there has been little research on the factors that drive and affect it. During the adoption of green strategies, it is necessary to consider the creation and measure the corresponding customer value chain. Based on such observations, this study adopted two study objectives, which are fulfilled within the scope of this study. The first study objective 'To identify the needs and strategies to create a value proposition in an organization to foster green innovation' is satisfied through an extensive literature review and organized two successful internal workshops within the scope of GREENOVET project. The outcomes from the workshops were extremely useful to identify the needs and strategies to design and evaluate business canvases and to create and assess value proposition models for various types of organizations. Additionally, from the workshops, it was examined and explored how various attempts at green innovations and green mindsets in such organizations affect the overall green performances and competitive advantages.

The second study objective 'To study the accompanying limitations and challenges to create a value proposition in an organization to promote green innovation' is also satisfied through the literature survey and organized workshops within the study scope. The existing literature contributes to finding the current challenges and limitations to promote value proposition for green innovation. Additionally, the participants in the organized workshops also contributed to identify the possible limitations and challenges or bottlenecks, which are common in most organizations to promote green innovation. Valuable feedback collected from the workshops participants can be guided as useful for taking effective policies and strategies to promote green innovation at the participating organizations. From the feedback, it was noticed that there needs an iterative effort between educational institutions and various types of organizations/companies to facilitate the opportunity to green innovation in a region or country with certain theories and principles.

Moreover, this study adds to the existing literature on organizational behavior and innovation by addressing green environmental problems that have yet to be experimentally investigated. Furthermore, this study also presents a novel theoretical rationale for the linkages by considering the mediating challenges of green innovation strategies such as lack of support from government subsidies, lack of resources and skilled workforce, less communication and cooperation between firms, etc. Some limitations of this study hint at future studies. The study's major flaw is that the collected data was from a single region of a country, based on the selected viewpoint which makes the generalization of the study somehow difficult. Future research can be extended to study more regions or countries to get generalized requirements and thresholds for green innovation. In addition, future studies should evaluate the findings of this study considering different economic and cultural aspects, such as in newly industrialized countries, which have to lack environmental concerns.

Declaration of competing interest

We are happy to declare that there is no conflict of interest in this article.

Data availability

Data will be made available on request.

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