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Service Ecosystem Design for Improving the Service Sustainability: A Case of Career Counselling Services in the Italian Higher Education Institution

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Abstract: The call for further research on service sustainability at all levels has been increasingly stated within the past years. However, limited research has been conducted with regard to the macro level, in which services are inevitably influenced by social, cultural, economic and technological factors. This paper develops an ecosystem approach within the service context to design a service not only from a micro level (e.g., service experience, service encounters), but also from a social level in order to help businesses and public sectors to transform the relationship among individual, collective, social, and environmental systems and increase service sustainability. Then, it applies the developed Service Ecosystem Design (SED) model in a Career Counselling Service (CCS) in the University of Milano-Bicocca (Unimib) in order to demonstrate the usefulness of this model. The empirical data were collected from service providers to illustrate the current service system maps and from first-year undergraduates to understand their perceptions and expectations on campus CCS. The results show that the Unimib CCS is a research-oriented career service and the fundamental service improvements should focus on designing the peer counselling, follow-up, pre-service, a holistic online platform, law education, technology education, optional course, hands-on experiences and student activities.

Keywords: Service Ecosystem Design (SED); service sustainability; Career Counselling Service (CCS); university

1. Introduction

According to the Brundtland Report from the World Commission on Environment and Development [1], the definition of sustainable development was proposed as "development that meets the needs of today's generation without harming the ability of next generations to meet their own needs." From then on, there was a clear awareness of sustainability in people's minds [2]. Since the idea of sustainability involves a wide range of practical objectives, such as the triple bottom line concept [3–5], economic, ecological, and cultural and ethical objectives [6], for future prospects, the service sustainability should be considered as a contribution to human sustainable development. Service has been taken to be the application of ability by one entity to improve the quality of another [7], which concerns all those above-mentioned sustainability themes [8]. Shirahada and Fisk [9] define service sustainability (or sustainable service) as satisfying the demands of current providers and recipients to create mutual values together without diminishing the quality of future value co-creation. Obviously, a sustainable service can increase recipient satisfaction, in order to boost economic growth, social well-being and resource conservation, i.e., human resources and environmental resources. However, there was very little literature on service sustainability [10].

Since Design for Sustainability (DfS) is not a recent topic, in Ceschin and Gaziulusoy's article [11], the DfS approaches are categorised into four different innovation areas, namely Product Innovation level, Product-Service System Innovation (PSS) level, Spatio-Social Innovation level, and Socio-Technical System Innovation level. In this study, the design approaches (e.g., Green Design, Ecodesign, Emotionally Durable Design, and Design for Sustainable Behaviour, Cradle-to-Cradle Design, Biomimicry Design and Design for the Base of the Pyramid) in the Product Innovation level mainly pay attention to the sustainable relationships between users and products and scarcely focus on social dimensions of sustainability [12]. Starting with the Product-Service System Innovation level, the design research not merely concentrates on product sustainability but also puts a spotlight on service aspects. PSSs [13] are complex artefacts made up of tangible products, intangible services and a network of actors combined to fulfil final customer needs through the delivery of functions instead of products [14–17]. The design approaches in the Spatio-Social Innovation level are primarily composed of Design for Social Innovation [18–21] and Systemic Design [22–24] that broadens the attention to solve social problems [25] and aims to enforce sustainable productive systems [26], respectively.

By far, design approaches that refer to the three previous levels found relatively adequate numbers of academic studies and practical cases, but there are many limitations associated with these approaches which hamper sustainability development not only with regard to the product but also the service. Within the Product Innovation level, the restraints focus mainly on green materials or product life-cycle which consider a single issue and lack depth and complex insights. In terms of Product-Service System Innovation level, the main limitations are the risk of unwanted ecological rebound effects. The level of Spatio-Social Innovation illustrates that the problem of social innovation is predominantly about high-cost service changes and superficial solutions. Thus, the Socio-Technical System Innovation level is currently receiving more and more attention from designers to understand how to design socio-technical systems to trigger 'cultural change' through systemic approaches [11]. Even though this paradigm is the optimal way to give a sustainable answer, there were few studies and insufficient approaches to support the advancement of products or services within new socio-technical systems. Therefore, this paper aims to address this limitation within the socio-technical dimensions in order to provide a feasible approach to ensure design sustainability.

To give a deeper insight into the Social-Technical System Innovation level, the apparent trend is that design approaches begin with solving sustainable product-related issues (e.g., materials and environment), and are then concerned with the larger context of organisational, technological, social, and cultural innovations. Therefore, the present understanding regarding achieving sustainability is that a sustainable relationship is regarded as a system property. In other words, radical transformational change is identified to require behavioural, institutional, social and cultural change in how human society performs and not only technological interventions [11,24,27,28]. However, the emerging view is that the most pressing aspect of sustainability is at the macro level, where the unit of analysis is collective. In fact, many studies call for research into this aspect. Anderson et al. [29] highlighted that future research should make an effort to change the relationship among economic, social and environmental systems to ensure sustainable relationships. Ostrom et al. [30], when discussing the research priorities for the science of service, stated that further research needs to focus on the service macro level and consider these macro dimensions to uplift communities through service sustainability. It is evident that there is a need for service researchers to take this responsibility to add the social level to their research agendas. The objective of this study is to shed light on the question of how design approaches can ensure service sustainability involving macro dimensions. We will address the following challenges: (1) How to build a theoretical framework to help service designers to create a sustainable service according to a holistic view (from individual to collective); (2) how to address the framework validity testing through empirical implications.

To resolve these issues, we leaned on both theoretical research and empirical research. Theoretical support was first engaged to review the academic literature as well as to identify the service ecosystem design approaches which can solve the social-related issues and fit the research context. The theoretical

framework for service ecosystem design has been established to theoretically advance service design knowledge and practically guide practitioners to design or enhance services. We subsequently employed the service ecosystem design model to the Career Counselling Service (CCS) in the University of Milano-Bicocca (Unimib), Italy, to investigate the existing service system from a service staff perspective and to understand service perceptions and service expectations from the student side. Thus, we carried out several unstructured interviews with the service staff and director and collected service information from Unimib official websites, its internal materials (e.g., service presentations and reports), and academic publications in the period of November to December 2017. The unstructured interviews and documentation were both in English. Afterwards, we repeatedly visited the Career Counselling Centre site as well. In March 2018, we did the structured interviews and open-ended questionnaires in Italian with first-year students from the University of Milano-Bicocca to understand their service perceptions and potential needs. Before the investigation, we gave our respondents a research protocol for both the interview and the questionnaire; to protect their privacy, they are not listed by name. Overall, the entire structure of this paper is arranged as follows. We present the literature review on the topics of Service Ecosystem Design (SED) and Career Counselling Service (CCS) to give a deep understanding of this research context in Section 2. In Section 3, the theoretical framework of SED to extend the service knowledge and guide practical work was built, and Section 4 describes the application of this model to the CCS in the University of Milano-Bicocca. Section 5 summarizes the research findings and defines service improvements. In Section 6, it discusses the research results compared to previous studies and outlines the lessons for the other service design works. Finally, we present the research conclusions in Section 7.

2. Literature Review

2.1. Service Ecosystem Design

Service industries hold the main percentage of economic gains. The international trade in service is the essential driver of growth in global exports, and domestic service sectors provide the main contribution to the country's economic development. With the rise of the service economy, the need for managing and understanding services makes specific service disciplines (like service marketing and management) appear [31]. Compared to Service-Dominant (S-D) Logic [32], the service value evolves different standpoints in the conventional economic worldview called Goods-Dominant (G-D) Logic. In the goods-centred worldviews, the service is regarded as having value-enhancing add-ons for products. For example, in the transitional period from S-D Logic to G-D Logic, some concepts, such as servuction [33], servitization [34] and Product-Service System (PSS) [35] gradually emerge to consider the service value in the goods-dominant territory. In 1982, G. Lynn Shostack [36] published an article 'How to Design A Service' which defined the embryonic idea of service design and proposed service blueprint as a design tool. After that, the service design education and training programs in Higher Education Institutions, publications (e.g., books, papers and reports), service design agencies (e.g., live | work, IEDO, Enginegroup and Thinkpublic), service design conferences (e.g., Service Design Network and ServDes.) and the magazine Touchpoint on this topic have been growing.

Within the course of service design decades, the question is whether it evolves in this complex and changing society. Daniela Sangiorgi [37] proposed three phases—Interactions, Complexity and Transformation—for the evolution of service design. It opens with the Interaction Paradigm that introduces interaction design discipline, practices, and tools into service design [38], considering the touchpoints between the user and the supply system. Following this, since Interaction Design has enlarged its scale and context within a wider system of service organisations, service design within the Complexity Paradigm becomes a connector to create co-value among different stakeholders [39]. In the third phase of service design evolution, it refers to Transformation Design [40] that can develop a fundamental change in public sectors and company culture. This new design discipline, especially,

makes a contribution to "complex problem-solving space" by interdisciplinary collaborators working together with participatory design techniques in non-traditional territories.

Looking from the other side, technology, in the service context, has been seen as a game changer which means it shapes interaction methods between customers, machines and service providers in increasing complex service systems [41–43]. For this reason, the new extension of the boundary of S-D logic is from 'value-in-use' to 'value in context', which means the research focus has shifted to study service research through the service ecosystem perspective. Service scholars are increasingly adopting a service ecosystem perspective [44–47] that has been accorded as "comparatively self-contained, self-regulating system(s) of resource-incorporating actors linked by shared system arrangements and common value creation through service exchange" [48,49]. This perspective stresses the attention of the socio-historic contexts, composed of multiple institutions, that lead to value determination and these interactions [50]. The service ecosystem perspective integrates a sociological view [51] and underlines the embeddedness of direct microlevel interactions within more intricate mesosystems or macrosystems [50], which are direct or indirect actions of multiple actors [52].

As extending the context of S-D Logic has been developed into the ecosystem perspective, the territories of design for services are also enlarged. It has a strong effect on service design, calling attention to the need for the arrangement of actors, processes, and technologies, all managed through design-based approaches and tools [53]. In this setting, the idea of the service ecosystem design subsequently resulted [43,54,55]. The emerging trend of service ecosystems in service design [56,57], entangles systemic design from combining design and system thinking [58]. This perspective has been consistent with the discussion on service systems [41,42] and has influenced the way different actors interact. Service ecosystem design exhibits a growing need of solving the complex issues related to public service rearrangement or social challenges, aligned with the intent of transformation/social design [59] or transformative service research [29]. It is obviously important to consider service from social dimensions since services are part of the social world where people live [53]. Van Riel [60] debates that service should not be recognised as a disconnected phenomenon but rather as a portion of a network, a system, linking departments within the firm, multiple firms and clients in an ecosystem. It helps private sectors and public organisations to shape the relationship among individual, technological, social, and environmental systems to ensure service sustainability. It should be certain that design in the service ecosystem paradigm is an up-and-coming field for further exploration.

2.2. Career Counselling Service

The verbal profession has been regarded as a vague area in career interventions, and it emerges from "career or vocational guidance", "job or career counselling", "occupational coaching", to "psychoeducational models", and more [61]. This situation of no agreement is mainly due to linguistic and conceptual differences [62] and the evolution of vocational services [63]. However, to date, it is quite common for people to find the terms "career counselling" and "career guidance" since academics, policy-makers, and practitioners use them as the universal reference [64]. Until the last 25 years or so in America, there has barely been any differentiation between career counselling and vocational or career guidance [61]. In this research, the name of this service is defined as career counselling. It was marked when Frank Parsons's posthumous publication Choosing a Vocation [65], in 1909, effectively coined counselling as a profession [66]. After a 100-year history, four distinct traditions have emerged [67], from Individual Differences (matching people to employment), Individual Development (the notions of career patterns, life-career stages, and worker as one of several life roles), Social Learning (career thoughts, beliefs and learning), to Constructivism-Social Constructionism (relationship, story, life themes, and meaning-making). The definitions of the career counselling service changed when the concept of career counselling went through these four stages. The aim of this service starts with an emphasis on self-awareness and self-directing [68,69], turning it into a holistic approach which means integrating personal competencies, skills, and work habits with the information obtained on their general interests, education and work experience [70]. This study adopts the latest notion

"constructivist–Social constructionist" tradition, that applies the career counselling service into different paradigms: Occupational education to cultivate career development, career guidance to identify vocational fit, or life design to build a career [71].

The context of this study focuses on university settings, as such, it does not focus on the details of the recruitment process [72] since past studies have displayed that the significance of work values transforms across the School-to-Work (STW) transition time and this period is a vital life event from standpoints of career development and developmental psychology [73]. It is mainly because of cultural, structural and sociological disparities between universities and the world of work [73]. Furthermore, several internal issues and external challenges that exist nowadays make the STW transition time more complicated for many youths. The latest report from the National College Health Assessment indicated that a Career-Related Issue (29.3%) was one of the main difficulties undergraduates had to handle within the last 12 months [74]. Some students will be unable to study in their preferred field, an increasing number of students drop out of school, and others will be unable to find jobs that match their education [75]. From the challenges from outside of campus, in the 21st century, the world of work induces feelings of insecurity and anxiety [71]. The corresponding reason is that the socio-economic climate changed, with the digital revolution and globalization, that have been reshaping working arrangements and contents, developing various expectations with regard to vocational skills and soft skills [76], and creating more temporary tasks and time-limited jobs [77,78].

The necessity of cultivating students for career development is evident so that they are able to promote academic achievement [79] and better navigate the complexity of today's workplace after graduation [80]. When considering the matter of career education in university settings and the shortage for a better STW transition, it can be valuable to broaden the promising choices in students' lives and build a flourishing society simultaneously. Within this context, career interventions play a helpful role, enabling confused students to navigate the STW transition well, tackling the problems faced in the process of career development. More importantly, career counselling is the most powerful intervention in the matter of career development, which has been demonstrated in the survey of Savickas [81], carried out on his well-known coworkers [80]. However, the quality of the CCS needs to be noticed. In the United States, university students have reported that one of their biggest demands is a good career service in university [82]. It is increasingly clear that the existing problems are a lack of understanding student needs [83,84], being unaware of this service [85,86], the absence of holistic personalized services [87], the need of integrating theory, practice and research [88] and the limited resources [80,89] in CCS. Moreover, higher education institutions pay attention to the CCS among third-year and fourth-year students, instead of first-year students [67,87,90,91]. The newcomers in the university setting encounter largely psychological, social, economic and political burdens which are based on the new paradigm of today's circumstance [92]. Therefore, solving the existing problems in the campus CCS is an emerging issue for service sustainability, in order to improve academic life and future career paths for university students.

3. Theoretical Framework

Due to the research that applies service ecosystem design perspective to increase service sustainability, there is a critical need to frame the service ecosystem framework from the service design perspective to understand how to create or improve a service. Service experiences are more and more co-created through multiple interactions between service provider networks and customer networks in the service ecosystem pattern, and the original goal of services should be formed to facilitate them [93]. In order to reach this, more and new design approaches are required to establish communication platforms and to support many-to-many interactions that enable the service designer and service actors to create sustainable services through service ecosystem perspective [94,95]. This extended view is significant to open-up new possibilities for innovation in the service ecosystem that go beyond the organisation's boundaries. For the purpose of establishing multiple interaction platforms, this paper starts with the ecological system theory [96] originated from developmental psychology,

which proposed the ecological model of human development. This system consists of five formulated subsystems, from microsystems, mesosystems, exosystems, macrosystems, to chronosystems, that work to indicate human development. It shares aspects in common with living system approaches [97,98] or complex adaptive systems [99], in which symbiotic systems with interactive living subsystems are recognised [100]. The ecological system theory holds with the perspective of the whole ecological system in which human growth occurs.

With regard to an individual career, it also establishes the entire ecological system in which career development happens. Providing an in-depth study of service on well-being from the ecosystem aspect, this work primitively and principally lies within the theoretical framework, see Figure 1, of Flourishing in the Social Ecology [100]. This framework is an approach to the notion of social ecology, a social systems viewpoint [101,102], enacting design both physically (e.g., merchandise) and analytically [100]. The article by Jones [100] called 'Soft service design outside the envelope of healthcare' explains each cycle, from microsystem to ecosystem, of flourishing in the social-ecosystem map. The first aspect of this framework that needs to be pointed out is the minimum circle—Microsystem—which relates a person to their direct social contact (e.g., their family, their friends, their workplace and other groups), and the flourishing in this layer presents individual well-being and social cohesion [103]. Then, one bigger layer—Mesosystem—is recognised as a system of individual microsystems empowering people toward social engagement and aiming to achieve social coherence or integration. Another circle is the Exosystem level, which involves a larger institutional setting such as business networks, local government organisations, and neighbourhoods reachable within the experience of the individual. In the layer of the Macrosystem, it refers to 'blueprints' for societal functions, for example, cultural and economic environments and public policy [104]. The last layer of the Ecosystem creates an inclusive final system and environment boundary and transforms independently of social behavior, which differs from other system levels. Along with the intangible factors of social determinants and environmental uncertainties, these contributing factors might seem to be, in practice, the causation of illness.

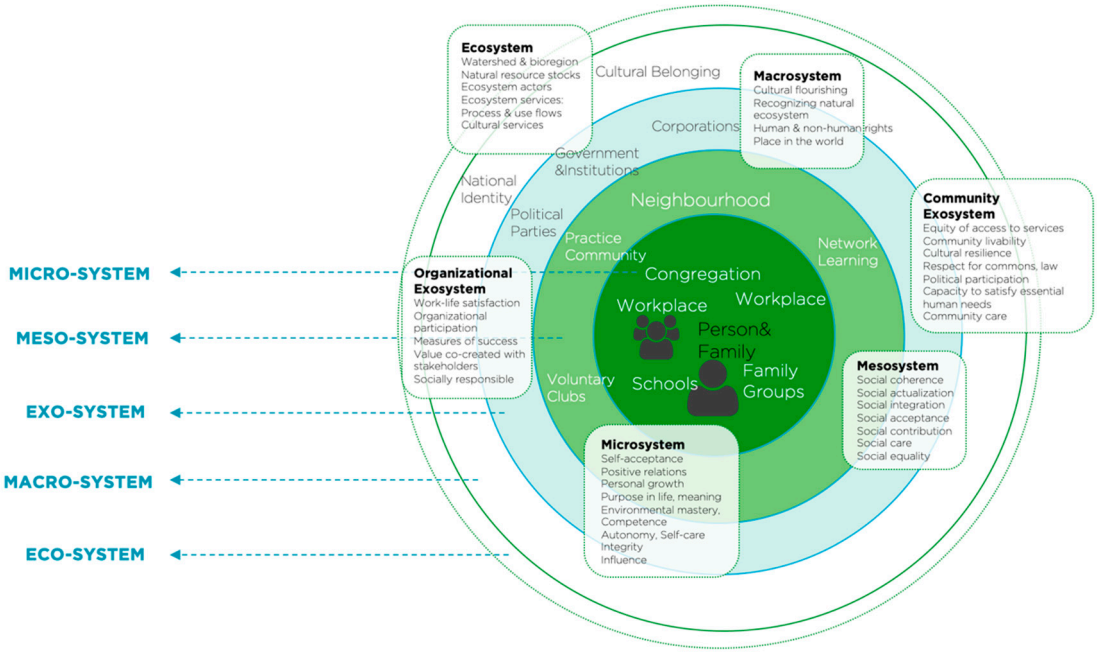

Figure 1. Flourishing in the Social Ecology [100].

In the complex service ecosystem structures, there is a need to identify the actors who are correlated with each single service or integrated services. Whether service research or design research, the service actors are seen as an original and essential factor of service interactions, service delivery, and service value-creation. Within service science, services contain socio-technical determinants which

exchange competencies and resources diversely [105]. In design research, it is further portrayed as the urgent need for developing a scientific understanding of the configuration of tangible and intangible resources, in order to deliver quality service(s) [106]. For the purpose of this research, the service actors and actor-networks play a fundamental role, according to service system principles, in improving Interdependence structures, assisting interactions during Participation, shaping and directing the prospect Emergence, and all required Expertise as a tool to interpret each actor [43]. Since actors serve as an irreplaceable role in service design and development, the answer as to what are the service actor-networks, especially, in the complexity of service ecosystem context, is demanded. From the Actor-Network Theory (ANT), it proposes an angle to establish service networks from discerning the underlying tracks of socio-technical dynamics [105,107]. Yaneva [106], in her research, argued the ANT theory offers design research a way of clarifying how design can shape the social diversity, starting from designing encounters between humans and non-humans (environment and objects). This theory serves as a tool to examine how human and non-human actors cooperate with one and another to organise the service network [108], generating co-production or co-creation values.

Back to the centre of this study, the service ecosystem level involves a various range of actors or act-networks in different system cycles (microsystem, mesosystem, exosystem, macrosystem, and ecosystem). The relationships of service actors (networks) are displayed in Figure 2, which declares five types of interactions in the framework of the social ecology pattern. First, the 'receiver-provider' interaction in the Microsystem is relatively easy to understand as a simple one-to-one interaction. In the second layer, the Mesosystem, the relationship is defined as the 'receive-service' interaction. It means the value creation happened while different customers participated in a single service, which creates a social group of combining with receivers, deliverers and providers. Third, the relationship of service network in Exosystem is called the 'receiver-community' interaction, indicating the value co-creation in this level consists of service encounters between consumers and different service sectors or institutions.

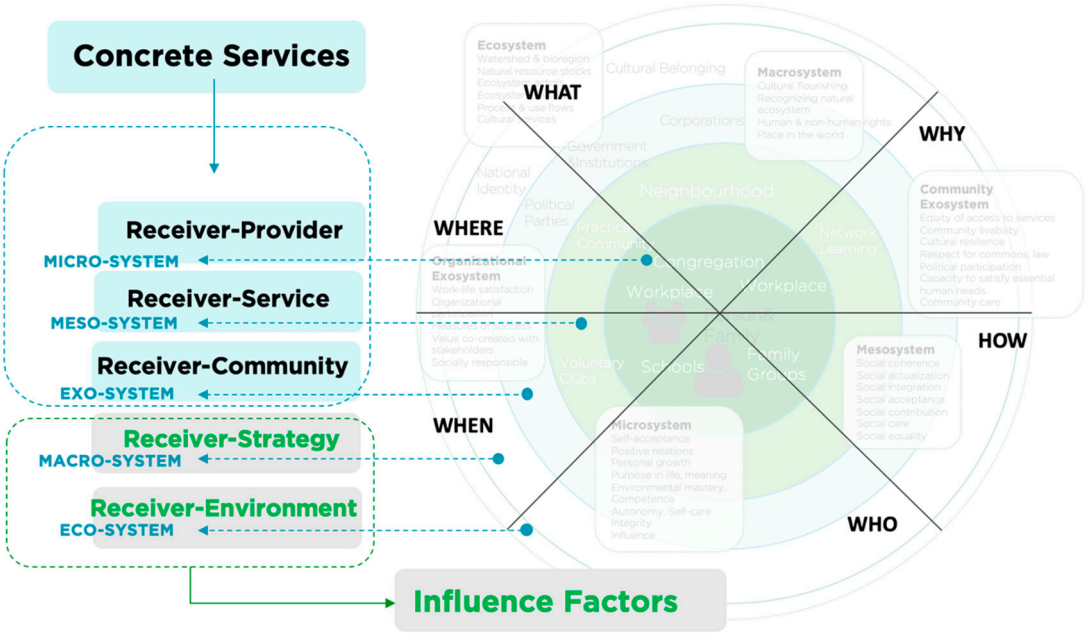

Figure 2. The Actor Interactions in the Social Ecology Map.

So far, the actor relationships remain located in the Concrete Service region, the following are descriptions of the positions in the Service Influencers region. In the level of the Macrosystem, it is identified as the 'receiver-strategy' interaction, which indicates the clients rarely interact with the strategy directly and influences services and receivers indirectly. This is due to the fact that the

Macrosystem level covers national identity and cultural belonging, specifically, national policies, laws, society, economics, etc. Thus, all these elements affect service sectors, organisations and services that customers receive. In the last level, the Ecosystem, the relationship is recognised as the 'receiver-environment' interaction where something needs to be considered in society or nature, for example, globalization, digitalization, climate change or natural resources. The topic of ANT theory in the service ecosystem field entails a wide range of possibilities to explain it in different stages. Besides, the service ecosystem design framework component definitions and examples are illustrated in Table 1.

Table 1. The service ecosystem design framework component definitions and examples.

Service System Level	Framework Components	Explanation/Definition	Examples of Services
Microsystem	Receiver-Provider	This phase considers the touchpoints between a service-receiver and the supply system, which mainly focuses on one-to-one interaction and the user is regarded as the study point.	A specialist gives a diagnosis and a prescription to his/her patient
Mesosystem	Receiver-Service	The interaction of 'receiver-service' is a connector to make the co-value among different actors within the service organization, that initiate and reinforce social engagement.	A student joins a class, which is provided by the school, with his/her classmate
Exosystem	Receiver-Community	The multiple interactions among different service entities are recognized as the pattern of 'receiver-community', which means a single service is provided by several organizations in a larger setting.	A new graduate attends to a job fair that is held by his/her university and the companies
Macrosystem	Reciever-Strategy	The macrosystem level covers national identity and cultural belonging, specifically national policies, laws, society, economic etc., which influences previous service systems and single service. Thus, in this phase, there is no direct interaction between the service-receivers and service-providers.	Every country has its own food culture, that influence restaurant services including eating time, the type of food, eating behaviors etc.
Ecosystem	Receiver-Phenomenon	Service ecosystem is a complex adaptive system to build an inclusive final system and environment boundary, that influences the service structure.	Technology is a main factor of changing the world of work

Up to now, this table presents a general classification of service actor-network in the framework. The socio-technical view, specifically, is going to be explored in detail in the discussion chapter, together with the empirical research. In the service ecology map, the column of 'WHO' plays as the human actors, and the column of 'WHERE' and 'HOW' act as non-human actors. The spectrum of 'WHEN' roughly represents the time duration in different cycles, and the area of 'WHY' signifies the meaning of the service for the individuals and the society.

4. Empirical Setting and Method

4.1. Research Setting and Rationale

The primary motivations of initiating this empirical research were to apply a service ecosystem design model into the CCS in the university as the specific research context, in order to understand what the existing service ecosystem map is, how to develop the service improvements and which lessons can be taken for future service research. Since the relationship between service design and career services had not previously been explored, this study was conducted with an exploratory research approach to understand what was occurring during the little-known situations, and to gain new insight, eventually generating value propositions for future research [109]. Additionally, the nature of service ecosystems is complex, considering social forces, various actors and resource integration activities [110], which should be analysed through micro-, meso-, exo, macro- and ecosystems. Given this complexity, we adopted a case study approach as the research strategy, integrating different qualitative data sources to illuminate these multiple perspectives, and established an in-depth analysis of a case and collected detailed information over a certain period of time [111–114]. We decided to use a single case to acquire rich data and longitudinal investigations, as this exploratory research aimed to analyze the complexity of service ecosystem design in a single case [115]. On the other hand, the single case design contained some drawbacks, such as the risk of overestimating available data and observer bias [116], which can be enhanced by research validity strategies. Up until this point, the research methods were

documentary evidence, semi-structured interviews and open-ended questionnaires to maintain both advantages and limitations of each method, advancing a more robust understanding of the intricate CCS ecosystem context. We centred our vision upon the viewpoint of direct service providers and service receivers. This provided chances to recognise appropriate interactions between actors, and essential institutional arrangements, which can give a relatively and effectively complete network within a larger CCS ecosystem.

In this study, the CCS ecosystem was analysed from the case of the University of Milano-Bicocca, the identified leading CCS performance in the Italian higher education institutions. It is located in the Lombardy Region which is Italy's most influential commercial, industrial, and financial centre. The fundamental belief of Unimib emphasises on providing practical and comprehensive education programs to their students. Since 1998, the Pirelli Factory has been transformed into a cutting-edge educational institution, which is divided into three main parts for teaching and learning activities—state-of-the-art research laboratories, sizable study areas, and a common area for students' activities. There are three university campuses with 28 buildings, spreading all over Milan, Monza and the Maldives, in Italy. Since its establishment, the goal of the Unimib is to train their youthful and dynamic students to become adults who are ready for the real world. Furthermore, in less than twenty years, it ranked as the 3rd biggest university in the Lombard region by student population. Additionally, there are currently 900 researchers and teachers, training students for a broad range of learning programs in Law, Psychology, Medicine, Economic-Statistics, Science, Education and Sociology. The available education initiatives offered cover: 32 undergraduate curricula, 36 graduate programs, and five unified graduate programs. At present, there are 33,000 enrolled students, of which more than 2200 are from overseas. Furthermore, the Bicocca University has research and education agreements with over 358 international institutions. The mission and vision of the university are to assist their students to discover and find their occupation, develop their own interests, gain skills and a solid know-how to form their career.

In the first stage, the work of identifying and inquiring access to the study sites and promoting the relationships with the staff who have been working in the career centre, tutors and professors who are in charge of student courses, and students. The second stage was to consider the detailed methods applied in each phase (four phases in total). After that, the third phase aimed to prepare the research ethics consent for participants for each research activity, based on the requirements from the Unimib ethics committee. In the end, the data management was clarified. To be specific, the research activities in each phase were: Phase 1—to understand the existing service system from a staff aspect with unstructured interviews and documentation; Phase 2—to deeply explore the service perceptions and expectations from the student perspective with semi-structured interviews; Phase 3—to widely justify the findings from in-depth interviews employing open-ended interviews; Phase 4—to identify the service improvements from students' prospects and staffs' professional knowledge.

4.2. Data Collection

Data were collected between November 2017 and May 2018 from three sources: Documentation, interviews and qualitative questionnaires. The use of diverse methods by different researchers converged into triangulated data to verify findings [114,117] and to enhance research reliability and validity [118]. Their multiple methods were also instrumental in supporting us to move our analysis from the microsystem, to the mesosystem, exosystem, macrosystem and ecosystem. In Phase 1, it sought to illuminate the CCS system and its background, according to several unstructured interviews and talks with the director and one staff from the service centre and documentary evidence through Unimib official websites, its internal materials (e.g., service presentations and reports), and academic publications. The details of informal interviews were as follows: (1) The director of the CCS centre, which garnered general information regarding the service system, related university activities, regional organisations and national policies; (2) staff working in the service, which explored the service

specifications and service interactions with students. The unstructured interviews and documentation were both in English. Afterwards, we repeatedly visited the Career Counselling Centre site as well.

Phase 2, which included 26 formal semi-structured interviews, was conducted with first-year undergraduates at Bicocca University. The original objective of this phase was to investigate the understanding of existing services and potential services from students. Therefore, the structure of the semi-structured interviews was divided into three sections: (1) Inquiring upon the general background of expectations in university learning and their future plans; (2) investigating whether they know this service and how satisfied they are with it; (3) using co-creation approaches to engage them to propose future service scenarios. Before the investigation, we gave our respondents a research protocol for the interview; to protect their privacy, they are not listed by name. In terms of the interview, participants were recruited as non-paid volunteers, as the researcher promoted the project which was a study to understand their new campus life, career path, future life and providing the opportunity to communicate their thoughts and expectations on the career service, in order to design a service tailored to them. The interview was an in-depth interview (face-to-face) lasting 40–60 min. The interview consent containing ethics issues was signed by each student before starting the interview. Audio records were taken with approval to extract transcriptions or notes. The 26 participants were from schools of Psychology, Economy and Commerce, Tourism, Organisational Science, Communication, Law, Bank Economy, Formative, Sociology, Ambience Science and Technology and Computer Technology, in the first year of their education program. The participants' background covered a wide range of disciplines. There were 17 females and 9 males comprising this group.

Within Phase 3, there were 487 responses to online questionnaires and 220 invalid responses. Therefore, the valid answers from Unimib were 267 students and this correlated to nearly 54.8% of the overall participants. The content of the questionnaire is combined with nine questions following the inquiring logic of interviews. The data collection method in Italy was Qualtrics Survey software. The consent questionnaire containing ethics issues was completed by each student before starting. They came from schools of Psychosocial Sciences of Communication, Mathematics, Economy, Chemistry, Physics and Psychology. The valid responses, in Unimib, made up for around 34.9% of the overall population. Furthermore, there were 583 males from a first-year education program who completed the open-ended questions, and approximately 76.1% of the total responses were male. Comparing the responses from girls, there were 178 first-year students who responded to the questions completely, and nearly 23.2% of the whole population had completed the questionnaire. In the end, there were five students who did not reply to the question of gender, that made up 0.7% of the total population. Phase 4 was finished by the results from students' views on campus CCS (Phase 2 and Phase 3) and some informal interviews with service providers.

4.3. Data Analysis

All the informal interviews with service providers and 26 formal interviews with first-year students were audio-recorded, note-taken, and transcribed. Interpretation of the data obtained was via the six-step thematic analysis [119] for qualitative data of both unstructured interviews, semi-structured interviews and open-ended questionnaires, which was based on themes emerging from the text. In line with the Braun and Clarke [119] process, transcription and familiarization with the data are repeated until the initial ideas of the data emerge. These generated ideas are grouped into the interesting codes, which creates some potential themes. Reading and re-reading the potential themes aims to confirm the specific themes and form precise names and definitions for each theme. In the end, the last analysis is performed on the selected extracts and produces scholarly results. Thematic analysis is a method for recognizing, analyzing and reporting the themes for the service ecosystem design model, and describe the data set richly, including various aspects of the research patterns [120]. It seems evident, particularly, given the above theoretical framework established on the nature of how sustainable services perform within an ecosystem perspective, the analysis should be clearly structured around the

micro-, meso-, exo-, macro- and eco-systems first therein. Subsequently, there was a need to distinguish service actors from actant human (Who), actant non-human (What, How, Where), the service meaning (Why), and the time (When) within each system. In the data analysis part, there were two sections that should be considered separately as follows: (1) Part 1: To illustrate the existing service system by acknowledging the institutions underpinning the activities and actions of the key actors (Phase 1); (2) Part 2: To define the service improvements according to our interpretation from service providers, service receivers and how they fit into the narrative flow of service ecosystem design perspective (Phase 2, Phase 3 and Phase 4).

5. Results

To facilitate the analysis, the constituent components of the service ecosystem design model were illustrated orderly from Micro-, to Meso-, Exo-, Macro-, Ecosystems.

5.1. Existing CCS System

The University of Milano-Bicocca offers students a guidance service network, which includes the Student Orientation Service (S.O.S.), Orientation Workshops (LAB'O), Psychosocial Counselling for Orientation, Psychological Counselling, Internships and Traineeships, Job Placement, and Disability and DSA, see Figure 3. All of these services collaboratively assist students to lead a bright campus life, an effective academic study, and a promising future path. First, the Student Orientation Service (S.O.S.) plays a vital role in introducing the general information on what education offers, orientation projects, registration and enrollment processes, and opportunities that could provide to students (enrolled and non-enrolled). Specifically, it allows students to understand all the possible services available to meet their needs. Second, the main service on guiding and educating career development for students, graduates, and workers, names the Psychosocial Counselling Centre for Orientation, involving the psychological needs of orientation, re-orientation, and training and professional planning. The specialised psychologists offer their target guests consultations to discover and reflect the focused topics, the prefiguration of the future, and individual resources support. After that, the services of Traineeships and Internships and Job Placement aim to provide career-related opportunities to students. The Orientation Workshops (LAB'O) gives the possibilities to potential students and enrolled students. Additionally, Psychological Counselling also helps students to explore a full and in-depth understanding of their potentials to study and reduce psychological disorders (e.g., anxiety and stress) caused by career-related issues and academic performance. In the end, the Disability and DSA service, in particular, proposes to focus on those students with special learning disorders and other disabilities.

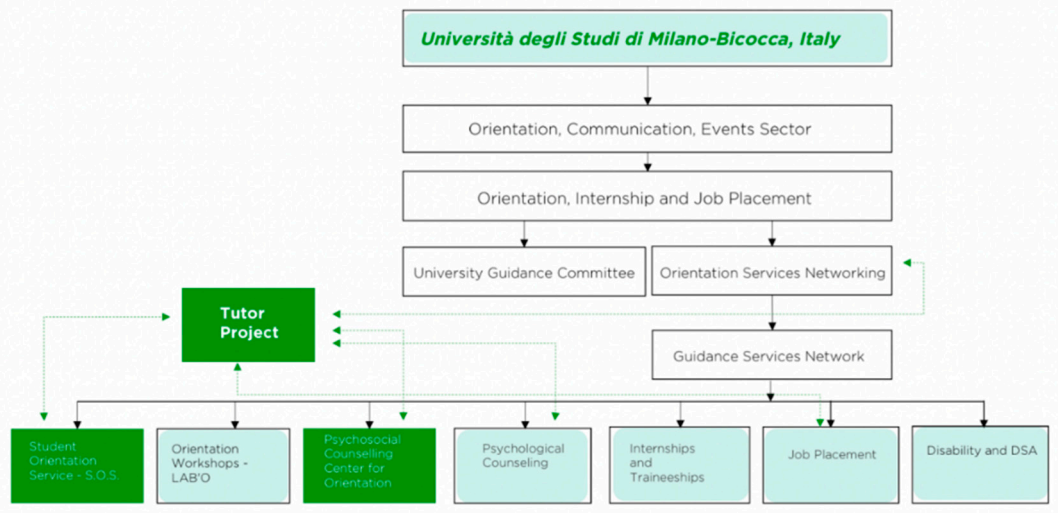

Figure 3. The Service System Structure in the University of Milano-Bicocca.

The Tutor Project, as a special Unimib project, is a bridge between students and other services, such as the Student Orientation Service (S.O.S.), Psychosocial Counselling Centre for Orientation, Job Placement, Psychological Counselling, and Orientation Service Networking together, in order to understand what students' need and how the university services provided could better help students. Unlike the other services, the aim of this Tutor service is to build a closer relationship with students and facilitate their campus life. It empowers students in their campus activities, directly makes communication with them and provides suggestions to them, so that the Tutor Project acts as a catalyst on the effectivity and feasibility of their campus life.

After the basic introduction of the core CCS structure offered by the University of Milano-Bicocca, the career service ecosystem is going to be analysed and visualized through a service ecosystem design approach, see Figure 4. The original career service ecosystem figure not only presents what the current service resources are and how they interact but also implicates what service weak connections should be enhanced as a whole ecosystem to increase service sustainability thereafter. It shows the relation between actors, resources, and activities in a defined context, and the change within the ecosystem of a single part can influence and change the whole system [37]. The vision is expanded from a single CCS system in the university to a complex CCS ecosystem with a macro-level of phenomenal, economic and social factors. The following interpretation is going to clearly explain the relationship between actant human resources and actant non-human resources, in order to discuss the way of delivering quality service(s) [106].

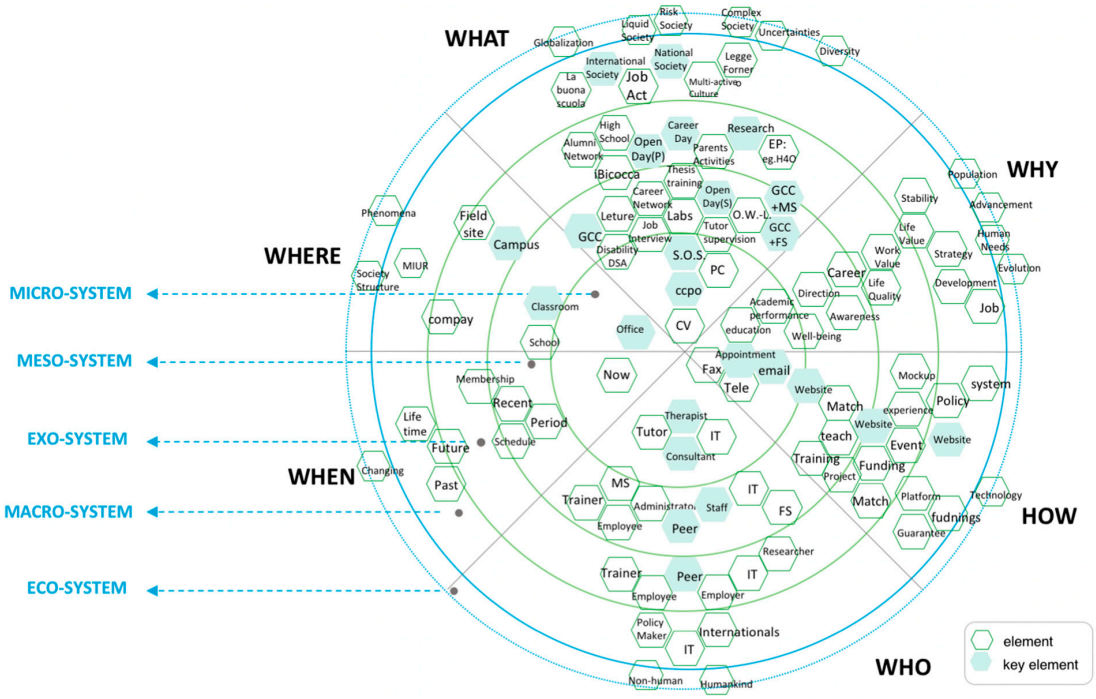

Figure 4. The Existing Career Counselling Service (CCS) Map in Unimib through Service Ecosystem Perspective.

5.1.1. Micro-System

In the micro circle, the service encounter has received much attention considering the touchpoints between the service user and service supplier. Within the basic interaction paradigm, service design principally concerns a one-to-one interaction which takes customers as the focus to be studied [59]. In keeping with the case of CCS in Unimib, this cycle puts increased emphasis on the Psychosocial Career Counselling (CCPO), and Student Orientation Service (S.O.S.). After these services, the training on Curriculum Vitae skills and Psychological Counselling (PC) are an added value to the Career Interventions. The actors in this level are recognised as therapist, counsellor, tutor, and IT specialist,

which follows the one-to-one interaction involving only a receiver and a provider. Additionally, the approaches for making a counselling appointment are email, telephone, and fax, and the website acts as a method of presenting related information. The location of providing these services is the office, and the description regarding the time for this kind of service is 'now' as they normally happened as face-to-face chats. The contributions of these services are recorded as education in general and academic performances.

5.1.2. Meso-System

The relationship in the Meso level is defined as the 'receiver-service' interaction, which has been recognised as a wider system of service organisations. Service design becomes a connector to create co-value among different stakeholders [39] within one institution, initiating social engagement. There are a lot more services in the level of the mesosystem, compared to the microsystem in Unimib. These services are the Group Career Counselling (GCC), the GCC for Foreign Students, the GCC for Mature Students, and Open Day(s), Labs, Tutor Supervision, Job Interviews, Orientation Workshops (AB'O (O.W.L.)), Career Network, Lectures, and Thesis Training. Therefore, the Unimib provides a wide range of career activities for students, including group counselling, university information, tutor management on students' issues, and some education programs for their career path. Then, the actors here include professional staff in the Guidance Service Network, peers, university administrators, company employees, trainers, mature students, foreign students, and IT specialists. The relationship among all these actors is a multiple interactions one. The places to hold these activities are the classroom and each school. The methods of connecting actors are different activities (e.g., matches or training), and the official website as a way of distributing that news.

5.1.3. Exo-System

Within the exo-system paradigm, the many-to-many interactions among different service entities are considered as the pattern of 'receiver-community', underscoring a key idea on the boundaries of adaptive resource exchanges between entities [121]. Compared to the meso-system, the fundamental difference in this level is that a single service is co-created by diverse institutions in a larger setting. The cycle of the Exosystem in Unimib involves the activities with companies, other universities, high schools and parents, such as the Open Day for Parents, Career Day, Research, External Projects (e.g., H4O), Parents Activities, High School, Alumni Network, and iBicocca (a project of spreading the personal skills in the workplace). The peers act as a very significant role in this layer and other stakeholders are researchers, employees, trainers, employers, and IT specialists. The locations for conducting these services are inside the campus, and, sometimes, companies. The description of 'when' can be 'future' and 'schedule' that sometimes can happen later than the activities in the mesosystem, and the values of these services are building work value and improving the life quality for students. However, an additional explanation is only needed for the term 'funding' (in 'HOW') that indicates the ways of gaining the research funding through the research activities (e.g., publications and project applications), in order to make the service more evident and to better support this service.

5.1.4. Macro-System

The macro-system indicates that there are almost no direct interactions between users and these social dimensions, rather influencing the services within the exo-, meso-, and microsystems. Therefore, particular economic, cultural and political institutions and practices co-articulate this service [37], within which the larger macro-structure can be more agile, fluid and adaptable than the previous service levels [122]. This is due to the fact that the Macrosystem level covers national identity and cultural belonging; specifically, national policies, laws, society, economics, etc. Thus, all these elements affect service sectors, organisations and services that customers receive. The services provided in this cycle focus mainly on two sections—the national laws (La buona scuola (2015), Legge Fornero (2012), and Job Act (2016) and the collaborations among different institutions on the national or international

level. Thus, the service actors in this place should be considered to be policymakers, internationals and IT specialists, and the ways of acting out these services are related to 'system', 'policy', 'platform', 'funding', and 'guarantee'.

5.1.5. Eco-System

The ecosystem level is another service influencer which also means the elements here indirectly affect the users or specific services in a broad way. Ecosystem puts more of an importance on building an environmental boundary, in which this inclusive system changes independently of direct and indirect human interactions and social behaviour as a complex adaptive system [123]. The labels of 'Globalization', 'Liquid Society', 'Risk Society', 'Complex Society', 'Uncertainties' and 'Diversity' make up the current environmental changes, that influence the social structure, the world of work, and people's daily life. In other words, these complex contexts are the concern of a single person. Since the population growth, the progress of mankind (e.g., technology and society), human demands, and the evolution of species (e.g., animals, plants, or insects) over time are defined as the causes of gradual transformation in the ecosystem. 'Technology' as an important method positions in the pillar of 'how', as the Industrial Revolution and the Information Revolution have been changing the way people live and work. It brings innumerable benefits for human beings, such as the development of the social productivity, the progress of people's living standards, the optimization of the production organisation and the decrease of the mortality rate. Meanwhile, it also leads people to face some new challenges, for example, new competencies for work, population explosion, and environmental contamination. It is probably fair to say that all these diverse causes from both the good side and bad side convert the world to a more complex situation. Furthermore, the actors in this cycle can be defined as 'humankind' and 'non-human', and the time is always 'changing'. In the end, all these changes happened as 'phenomena' and 'society structure' that are invisible.

5.2. Sustainable CCS Improvements

In accordance with the empirical research results and the theoretical foundation of the service ecosystem point of view, the comprehensive service improvements are generated in the University of Milano-Bicocca. All the listed improvement possibilities are illustrated in the service ecology system. From the students' valuable results, the orange blocks represent the new service that should be considered, and the orange lines of the honeycomb shape should be enhanced in the initial service in some ways. From the service providers' professional experiences, the green blocks are recorded as new service proposals. Thus, in this section, the descriptions of the possibilities of service improvements are going to be explained for 'New Services' and for 'Enhanced Services', see Figure 5.

5.2.1. Micro-System

Within the micro level, firstly the 'Student Orientation Service (S.O.S.)' could be improved, which mainly contributes to lead students' campus life generally and allow them to know other university services. In fact, some participants thought that University could make this service more available, like increasing the time schedule, providing it even earlier, and increasing human resources. The complaints regarding responses were "waiting time was too long", "no one answers the phone" and so on. Another idea of 'follow-up' service is needed because the service should not be a one-time service and it was useful if it continued to track particular students' situations. This service does not exist in the University of Milano-Bicocca yet, but the service provider thought that it could be very helpful if this service provided long-term and follow-up support to students. The combination of applying human and digital resources shows a possible way to find the solution for building this service. Students can get some help after the career services, especially, a counselling service, when they need more, rather than only short-term help. The additional service should be initiated as 'Peer Counselling', considering the role of peers commonly acted as the support for their academic life and social life in both colleges. Peer Counselling/Learning can be recognised as the acquisition of

skills and knowledge through support among similar social groupings [124]. The Community Support Program (CSP) advocated peer-provided services and peer support, which were key precipitants in the expansion of these formal or informal activities [125] to support students, especially, first-year graduates. Participant 11 expressed 'now I'm happy because I found a peer group that study with me and stay with me in university'. Also, students valued the seniors' opinions "a senior that offer all the possible opportunities, not evaluating only one, but try to give a complete picture of the situation" (Participant 23). Evidently, peer support is very important for improving the quality of campus life for students, as life engagement is one of the key elements for increasing people's life quality.

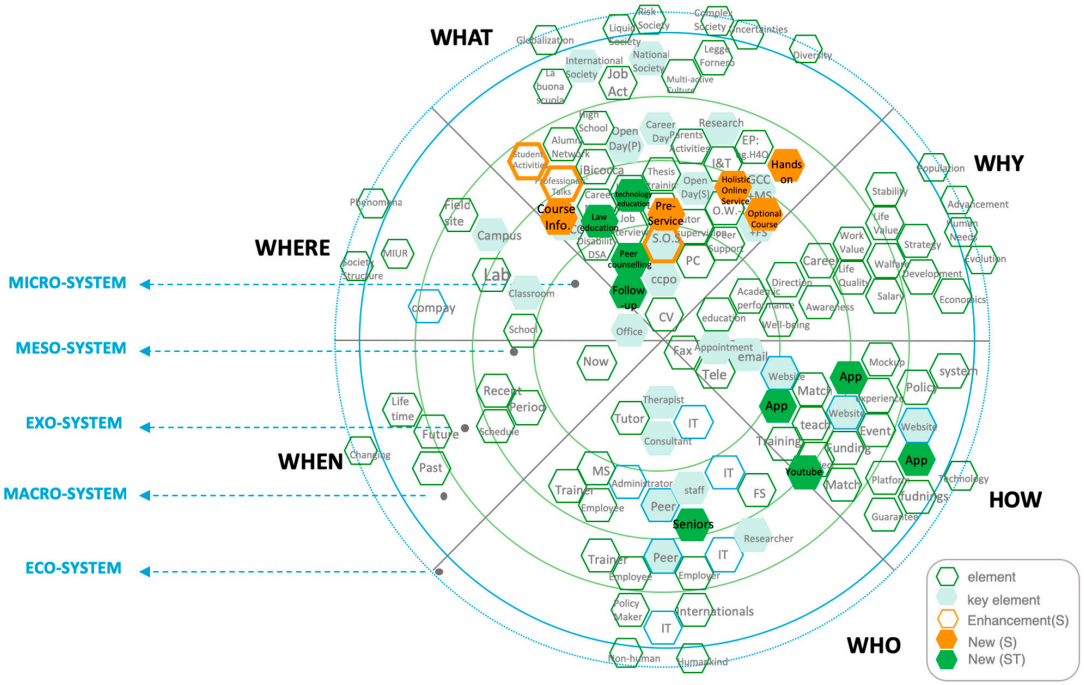

Figure 5. The Improvements on CCS in Unimib through the Service Ecosystem Perspective.

5.2.2. Meso-System

In accordance with the Meso level of the CCS network, most of the enhanced services and potential interventions were changed in this circle, such as pre-service for CCS visibility, introducing course information, creating an optional course, developing the holistic online service. All of these proposed services could improve the overall service quality. In terms of 'Pre-Service', it is an absolutely evident issue because the majority of the responses (from both interviews and questionnaires) are clear that students did not know the services and they suggest making the service more visible. According to the results from questionnaires, there were more than 8 in 9 (241) participants in this study who said they knew this service, but there were around only 1 in 7 (35) participants who attended this service. Based on data analysis, they had limited information about the services, which caused the participants to not receive the services, even though they needed them. The most common doubts students had for the CCS in Bicocca were "what activities do they provide?", "how to contact this service?", "where is the service?", "how to use it?", and so on. Another insight from students who used this service, the response to Question 6 about the satisfaction on the CCS was almost all (33/35) participants who used this service held positive opinions, and the answer to the Question 7 with regard to whether the CCS helped participants to solve their problems was the majority of participants (31/35) valued this service. The facts showed that campus CCS was identified as a vastly valuable and helpful intervention for their study and future career. Thus, the pre-service improvements should be categorised into three groups: (1) Propagandist (e.g., tutor, administrator, etc.) who can give the information of the career services during open day, a meeting, or a lecture; (2) online (e.g., website, WeChat, or QQ) where

there is a way to let the student know the service since they are internet savvy; (3) traditional media (e.g., posters, booklets or other materials), that act as supporting material to increase the awareness of the services.

The other career-related service that should be created is the 'Technology Education' program for university students since technology plays a role in dramatically changing the world in every aspect. The responsibility of the cultivation of how technology influenced the world of the work to students is increasingly imperative nowadays. Generally, technological literacy is a widespread target, and the dominant aims include learning the role of technological skills and knowledge for work-life and everyday life, the connection between the environment and technology, the history of technological literacy, and corresponding skills, such as planning, evaluating, social/ethical/moral thinking, awareness and entrepreneurship [126]. Since a university education program is the main resource provided to students and the most valuable activities they should finish, the university should see the work of introducing the course information as a fundamental job. However, the first-year students' voices from the interviews were clear that they still have the difficulties to understand the courses university offered, for example, the doubts about what the course is and what the content of the course is, how to figure out which course is good for them to gain knowledge for their future career. In terms of offering an 'Optional Course', first-year students believed that the benefit of having an optional career course was to give them an opportunity to learn about this issue in detail, build the awareness of the importance of career development for them, and establish a community for them to discuss this topic.

Initially, the 'Holistic Online Service' here means the extraordinarily diverse types of services and plays different roles in improving students' career paths. The web-based services present increasingly diverse possibilities for users to interact with each other and to comprehend services or activities via the internet [127], providing an array of benefits like ease of use or enhanced control [128–130]. It considers the online service as a channel of posting the related service information, an alternative way of traditional services and a new type of service created. The function of advertising other services is the most popular manner embedded in the existing service models in Unimib, for example, official websites of introducing what the career counselling service is, how to use this service, and where the office or location is. Another common example is that the career centre uses a webpage as another channel to inform students about the recent lectures, workshops or job fair information. All of these barely changed the service itself, and just act as a digital platform. Another defined function of the online service is a selective option for the traditional services. For instance, some students responded that they expected to receive online one-to-one counselling because they felt uncomfortable or somehow ashamed if they went to a counselling office and other students or professors knew it. These students believed the method of online communication encourages them to use this service instead of the on-site chat with a counsellor or a therapist. This would offer great assistance from the internet services since now the digital tools play a role just in the function of spreading the career service information, instead of further functions of alternative methods of traditional services and a new type of service built. This is why the service of 'online chat' is proposed as a new communication method amongst students. Also, there is the much-needed action of creating an application regarding career services, YouTube channel or improving the official website, in order to offer the professional career services to a wider audience. The method of exploring the possible services with information technology is a way to make the service more efficient, creating less need for human resources, and increasing the number of reachable students. This is also can deal with what are student voices from the interview and questionnaires.

5.2.3. Exo-System

The calling for a 'Hands-on Experience' from first-year students is to give them the opportunity to experience or visit companies, in order to learn different work types and consider what career choice they should reasonably make in their future. There is a gap between the knowledge learnt through

university education and the knowledge needed at work with regard to tertiary education [131]. The reason for this gap is the unheard-of rapid change in society and the workplace that has taken place during the last few decades. Sfard [132] brought forward two metaphors of learning: The acquisition metaphor regards learning as a process of knowledge gain, and the participation metaphor focuses on learning in the practices of social communities. Therefore, there is a necessary need to add the 'hands-on experience' service, especially, for freshmen, to visit and learn from the world of the work, which is different from an internship. Another weak link in Bicocca is the need to bring students more professional lectures that are given by experts (such as entrepreneurs). There is even a service called iBicocca in the university which provides professional lectures; however, students expect more of these services. In the case of CCS in Unimib, the service of organising student activities is an emergent need since, so far, there are few such services and the campus engagement activities are quite important for students. A clear understanding today is that student engagement has been seen as a proxy for quality [133], in keeping with governments increasingly interested in evaluating student outcomes [134]. It is relatively straightforward to view student engagement in four ways: The behavioral perspective, which emphases on useful training practice; the psychological perspective, which centres on an internal individual process; the socio-cultural perspective, which identifies the main role of socio-cultural context; and a holistic perspective, which endeavors to involve the students together [135]. Also, within our investigation, first-year students were expected to have more competencies and soft skills than in high school. Besides the technical skills (e.g., professional knowledge related to their study subjects and general knowledge related to history, geography or other interesting topics), they paid much attention to the learning of soft skills such as organisational skills, thinking more logically, opening the eyes to the world, working in groups, medium- and long-term vision, speaking in public and a new critical and complex vision.

6. Discussion

In accordance with the enlarged boundaries of transformational change for service research [24,27,49,136], we studied, with a focus on establishing a service ecosystem design approach within the Socio-Technical System Innovation level [11] to ensure sustainable service development, illustrating large-scale activities related to the career service improvements for bettering students' well-being and life quality in the Italian university. It deals with the call for more service design research on how to ensure service sustainability through socio-technical systems approaches [24] and makes a contribution at the intersection of service innovation, service design and Design for Sustainability (DfS). Specifically, the main input is the service ecosystem design framework established to understand societal service innovation, which is the recognition of five different levels: micro, meso, exo, macro, and eco. It shows the significance of acknowledging the tensions and complementarities between and within the systems [137]. By means of the level of complexity increased, a system defines a complex functioning which relates to its parts and the interplays between those parts [138].

We recognised evidence that considering the larger context of technological, social and cultural innovations beyond the institutional boundaries has resulted in changes that support the overall aim of improving CCS quality. For example, on account of the role of technology changing the occupational structure, the ecosystem of the career service becomes globalization, diversity, uncertainties, liquid society, complex society and risk society. Therefore, there are mainly two service designs associated with this eco-level: (1) 'Holistic Online Service' to promote the application of digital technology for improving the service accessibility and efficiency, and (2) 'Technology Education' to educate and prepare students with respect to the knowledge of changing each industry. In light of the 'Holistic Online Service', it is principally located in the mesosystem, but this service also interacts with the microsystem (e.g., online counselling intervention), mesosystem and exosystem (e.g., a webpage for service introduction, activity internet registration). The 'Technology Education' acts primarily on the mesosystem level since the most effective way to spread the technical knowledge about the vocations is to give a course to students.

We have also identified evidence that there were interdependent relationships within levels. For instance, in the microsystem, students have some questions or difficulties in relation to campus life (e.g., stress from study, anxiety, or inquiring some support services), so they usually go to the 'Student Orientation Service (S.O.S.)' to ask for help. After the consultation or inquiry, S.O.S. may suggest for them to use other services such as Psychosocial Career Counselling (CCPO), CV training, Psychological Counselling (PC), or Peer Counselling. Another example is that Open Day for students (within mesosystem), and Open Day for parents (within exosystem) disclose the university education programs, the campus support services, the facilities for students in the campus and other related information to students and parents.

Our findings generally indicate that, as this study develops the service ecosystem design model and apply it into CCS in the University of Milano-Bicocca, the illustrated figures and the findings showed that the opportunities for service innovation occur between different levels. From a holistic view, the feature of CCS in Bicocca University is typically a research-oriented service. For example, workers in Psychosocial Career Counselling (CCPO) within the micro-level produce some studies and publications regarding its counselling services to develop a better suitable service for the Unimib students. Also, the international society and the national society are given the opportunity to evaluate the career service from different universities to show what their career services are in each university, how it can be improved, and which could be promising solutions in the future.

7. Conclusions

The service ecosystem design approach offers a holistic view of service systems and a feasible method that allows service systems to coordinate, inform, and cooperate with one another. Building upon the conceptual framework from ecological system theory and flourishing in the social ecology model, it develops a comprehensive approach, evolving social and ecological aspects that contributes to the evolution of service design. The application of the SED method to the career counselling service in the University of Milano-Bicocca manifests that it can be effectively applied in complex service innovation contexts, which opens fresh insights into understanding and improving a service system. The SED method opens the design space for new forms of service innovation that go beyond the boundaries of the existing service approaches. This ecosystem thinking approach to the service concept contributes to a stronger focus on relationships, networks, and value creation. It helps researchers and service designers to understand or design a service from a systematic view, which increases service sustainability.

The service ecosystem design approach raises questions that deserve further study. In the aspect of other forthcoming research directions, there is still a substantial scope that needs to be studied. First, since service design has traditionally focused on the service experience at only a single service interface, the new services proposed based on service ecosystem perspective need further exploration. Second, this study uses the SED approach to mainly discuss service improvements influenced by social and ecological aspects, but there is a further need to analyze the service interactions from concrete service levels (i.e., micro-, meso-, exo-) to propose the feasible changes to macro-level and predict the trends at the eco-level. In the end, the SED method brings breadth and depth to facing the complexity of service systems and fostering new service innovations. In accordance with this method, designing or improving a service system requires the analysis of five service levels, so the knowledge from different disciplines can promote service development and sustainability. Therefore, we hope the SED approach provokes interdisciplinary research to interpret the promising knowledge from other fields contributing to value co-creation and service innovation.

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