Article

Synergising Research and Service Activities at Swiss Research Institutions to Accelerate Sustainable Development

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Abstract: Research that takes a pro-active role in bridging science and practice holds promise to accelerate progress towards the Sustainable Development Goals. While passing on best practices outside of academia, inspiration can be drawn from pressing global challenges. Using Swiss research institutions that maintain partnerships with low- and middle-income countries as a case study, the purpose of this study was to identify synergies between research and services for development (R&S4D). We mapped Swiss research institutions that host both types of activities and identified the strengths, weaknesses, opportunities, and threats (SWOT) linked to their hybrid models. Semi-structured interviews were conducted with representatives from the identified institutions, and data were analysed using the Framework Method. Strengths of combining R&S4D were observed on four levels: (i) individual (i.e., high employability outside academia); (ii) project (i.e., higher quality and practical relevance); (iii) entity (i.e., flexibility regarding funders, resources, and partners); and (iv) sustainable development (i.e., more impactful work). The main weaknesses were named as a decrease in the scientific quality of research projects specifically and inefficiency/lack of feasibility of implementation services. A lack of career paths and positions for individuals who wish to pursue academic research alongside services was identified as a threat. The Universities of Applied Sciences account for the largest share of hybrid positions in Switzerland; increasing their currently limited funding for research and international activities represents an opportunity. Our reserch adds a unique viewpoint to the discussion on the role of academia in supporting society to move towards sustainable development. It does so by exploring whether and how the concept of multisectoriality can work as an integral part of academia at the individual and the institutional level.

Keywords: sustainable development; Switzerland; project implementation; Universities of Applied Sciences; applied research; SWOT

1. Introduction

1.1. Background

Addressing contemporary global challenges to achieve the goals outlined in the United Nations (UN) 2030 Agenda for Sustainable Development (2030 Agenda hereinafter) [1] requires structural changes in the economic, environmental, and social spheres. By nature, this quest demands a multisector perspective and efforts to negotiate and navigate the transformative measures locally, nationally, and internationally. More efficient collaboration, coordination, and exchange of knowledge between sectors are essential to approaching sustainable development [1,2]. We previously argued that academic and research institutions can play a role by taking a more active stance in connecting with other sectors to accelerate efforts to achieve the Sustainable Development Goals (SDGs) [3]. However, working across sectors is inherently challenging and demands specific financial and human resources. Many academic and research institutions already struggle to communicate across their

own groups and departments and to offer opportunities beyond a mono-disciplinary career path [4–7]. This might be attributed to a culture and structural organisation that are barely conducive to operating in an interdisciplinary manner. Coupled with a shortage of "translational investigators", as described for example, in the medicine area (e.g., staff members trained to perform translational research and bridging the gap between innovation and implementation) [4,5], successful translations of scientific discoveries into practice are scarce. In addition, financial support is often inadequate, which requires applying to a variety of sources to cover the whole innovation to implementation cycle, widening intra-departmental gaps, and impeding translational research efforts.

Besides closing the research-to-implementation cycle at the institutional and funding level, a workforce is needed that is able to bridge those gaps and, in addition, to deal with the ethical dilemmas, problems, and other challenges along the transformation towards sustainable development [8–11]. Aligned with the UN's Decade of Education for Sustainable Development (UNDESD) (2005–2014) [12], a body of literature has accumulated on education for sustainable development (ESD) to form a new generation of "change agents" with a high degree of transformative literacy [13–16]. However, particularly higher education institutions seem to struggle with the shift from knowledge-orientation to action-orientation, which is necessary to form a future workforce that masters both theoretical and practical approaches to sustainable development [14,17]. Additionally, the bulk of research conducted thus far on ESD seems to stop at the higher education level, not taking into account the vast workforce that is already active in sustainable development domains.

Switzerland has proportionally the largest labour force qualified to do science and engineering jobs within Europe (>50%) [18]. This is the result of a combination of excellent public universities often working in tandem with the private sector and high-quality vocational education provided through apprenticeships and Universities of Applied Sciences and Arts (UAS). The latter have a triple mandate of (i) teaching; (ii) application-oriented research; and (iii) development and services for third parties. Hence, the UAS operate in a more multisectoral manner than the traditional universities. Overall, Switzerland is an important contributor to global research and innovation, featuring consistently among the top three countries in Europe, as measured by competitiveness, innovation, and science in- and output [18,19]. In 2017, the research and development (R&D) expenditure was 3.3% of the gross domestic product (GDP), as compared with the Organisation for Economic Cooperation and Development (OECD) average of 2.4% [18,20,21]. Switzerland fosters and attracts a multifaceted science and engineering workforce that is already integrated into key jobs relating to sustainable development, across academia, multilateral organisations, non-governmental organisations (NGOs), the private sector, and the government.

Against this background, the purpose of the current study was to identify Swiss research and academic institutions that, in addition to their research, provide technical expertise as a service in the domains largely covered by the 2030 Agenda. Particular emphasis was placed on institutions with a keen interest in low- and middle-income countries (LMICs). The specific objectives of this study were to identify the strengths, weaknesses, opportunities, and threats (SWOT) of such hybrid institutions in Switzerland and to provide guidance for funders of research and development projects in Switzerland and elsewhere. A semi-structured questionnaire was designed, based on the SWOT concept [22–24], to guide interviews with representatives of the identified institutions. The data were analysed using the Framework Method [25].

1.2. Structure of Paper

The paper is structured as follows. First, we explain the theoretical framework applied and put forward the research questions. The "Methods" section introduces the working definitions, the process of identifying the study institutions, the overall study design, and the data acquisition and analysis. The article then moves on to the "Results" presenting first the main hybrid institutions in Switzerland conducting both research and services for development (R&S4D). Second, key results of the SWOT analysis are reported, as

perceived by the entities' representatives. The results conclude with strategies applied or envisaged at Swiss R&S4D entities to further optimize their hybrid operations, including recommendations towards funders of research and/or development projects in Switzerland and internationally. The "Discussion" section puts the main findings into a global context of higher education institutions and their business models and also highlights the potential of expanding on the spectrum of research careers and positions in today's academic and global arena.

2. Methods

2.1. Working Definitions

"Development cooperation", "development", and "sustainable development" pertaining to LMICs were used interchangeably in this study, given today's strong alignment of development cooperation with the 2030 Agenda [26–28].

"Services for development" in LMICs refer, primarily, to project implementation services defined as "design, planning, implementation, monitoring, and evaluating of projects and programs, guided by the beneficiaries' needs and partners' requirements. Research plays no role or a marginal role in those projects/programs and the level of scientific rigour necessary for peer-reviewed publications is not generally invested". Second, services refer to any related activities that were perceived by the participants as non-research services in/for LMICs.

"Entities" as used in this study represent institutions, universities, laboratories, groups, centres, departments, schools, programs, etc., with double-competency in R&S4D, as identified using the methodology described subsequently.

2.2. Theoretical Framework

A literature review on the Web of Science revealed a striking scarcity of research studies conducted in the areas of hybrid/multisector research institutions and careers for development. We therefore drew from the concepts and analytical approaches found in the area of higher education, especially ESD [22,23], partnerships for sustainable development, and health research [24,25].

In 1987, the World Commission on Environment and Development (WCED), was formed for the common pursuit of "sustainable development" aiming to define the concept, increase global awareness, and prompt action towards identifying and implementing solutions. The Commission's report [29], was followed in 1992 by the Earth Summit in Rio de Janeiro, Brazil where the term "Education for Sustainable Development (ESD)", first emerged. In the same year, the UN proposed a related plan, "Educating for a Sustainable Future: Environment Population and Development" [30] leading onto the UNDESD a decade later [12]. In 2015, the UNDESD was proceeded by SDG 4 focussing on quality education with its target 4.7: "By 2030, ensure that all learners acquire knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development." [1]. To date, the bulk of ESD research focusses on sustainability in early childhood education, teacher education, and teaching and learning methods pertaining to primary or secondary education [31]. More recently, the tertiary sector (higher education for sustainable development; HESD) has given rise to separate research area [32]. This is to draw from the sector's unique contributions to ESD and beyond, which include the educational aspect (of future teachers and SD professionals) but also the active role of universities and research institutions in knowledge generation and solution-finding.

SDG 17 pledges to "revitalize the global partnership for sustainable development", while target 17.17 specifically demands to "encourage and promote effective public, public–private and civil society partnerships, building on the experience and resourcing strategies of partnerships" [1]. Prerequisites for global sustainable development include more efficient

coordination, collaboration, and knowledge exchange between different sectors. Pluralistic partnerships that operate beyond disciplines, sectors, and territorial boundaries are best prepared to deal with the complex challenges posed by the interdependency of SDGs and so-called wicked problems [3]. Transdisciplinary research, multisector collaborations, and transnational consortia are a few of the tools that can be used to handle this complexity [33–37].

The sustainable development movement has driven research and practice in both areas—ESD and partnerships for sustainable development. Recently, it has been revealed just how central both areas are to the attainment of the SDGs, both ultimately aiming at a more effective co-application of competencies to a challenge. The framework of ESD and partnerships for sustainable development, finally, points us to the gaps that our study aims to fill. First, we focus on researchers that have concluded tertiary education and that are in active employment and therefore not central to ESD research and practice, Second, we complement the aspect of co-application of competencies for sustainable development. We do so by assessing the R&S4D co-application practices within research institutions and individual research staff in Switzerland. Owing to the inductive and screening nature, we have no hypothesis. Instead, our project design follows four specific research questions:

1. Who are the main entities in Switzerland that conduct R&S4D?
2. What are the benefits and/or disadvantages of R&S4D hybrid institutions on personal, institutional, national, and sustainable development levels?
3. What are the structural opportunities and/or threats to R&S4D hybrid institutions?
4. How could funders of research and development projects in Switzerland and else-where foster hybrid activities, if found beneficial?

The SWOT method that was applied in the current study aimed at identifying the advantages and disadvantages of internal factors and the challenges and potential in the external environment. It has been used before in different areas where decision-making or the phrasing of recommendations was a key aspect. For example, Fahim and colleagues used the SWOT concept in combination with an analytic hierarchy process and entropy method to assess sustainable higher education reform quality in Morrocco [23]. Puciarelli and colleagues applied SWOT analysis to identify contemporary trends that impact higher education aiming at providing recommendations to the higher education sector and policymakers [22]. Hanlon et al. used the SWOT concept to propose context-relevant strategies for moving towards universal health coverage for people with mental disorders in Ethiopia [24]. The latter study combined SWOT with the Framework Method to analyse the data. This analytical approach facilitates comparative techniques by reviewing data across a matrix rather than generating social theory [25]. The Framework Method is often used to thematically analyse the transcripts derived from semi-structured interviews and it is a flexible and systematic approach. For the current study, a combined approach of SWOT and the Framework Method was used.

2.3. Identification of Swiss Research Institutions with Double Competency in R&S4D

All Swiss institutions of higher education were included in the first step, namely, the Federal Institutes of Technology, the cantonal universities, and the UAS that include the universities of teacher education [38]. Moreover, research facilities of national impor-tance, as designated by the Swiss State Secretariat for Education, Research and Innovation (SERI) were included, i.e., research infrastructures, research institutions, and technology competence centres [39].

Of those, institutions were included in a second selection that was trusted partners of the Swiss Agency for Development and Cooperation (SDC), an agency of the Federal Department of Foreign Affairs, and the main funder of development cooperation in Switzer-land [40]. From this second selection, a mostly high-level institutional list, relevant entities (e.g., departments, groups, and centres) were identified with the help of the Commission for Research Partnerships with Developing Countries (KFPE) and the Swiss Forum for Interna-tional Agricultural Research (SFIAR) webpages. Both institusions are are named partners on the SDC webpage and feature extensive lists of associated institutes and university

departments in Switzerland. Direct exchange with KFPE, SDC, and the partners involved in this project further helped to identify relevant entities within the second selection and to ensure that no key entities were missed. Entities with at least 50 staff members were initially approached for participation to capture those that had a regular stream of R&S4D at entity rather than individual level.

2.4. Study Design

Entities with at least 50 staff members were initially approached to participate in an interview. The highest level of management was generally approached at each entity, (i.e., directors, heads, chairs, and presidents) and asked directly for an interview and/or for naming a suitable substitute. The highest managerial level was targeted in order to gain high-level insight on both research and implementation activities and institutional structure, history, and experience related to the domains of research and services for sustainable development. Where the contact email of the highest level of management was unavailable or where the entity was still at a too high level at the final selection stage (e.g., a whole cantonal university or UAS where a sub-entity with R&S4D double-competency could not be identified), the international office, research office, or a similar institutional body with wider knowledge on institutional network and funding sources was approached. Where this was also unavailable, the inquiry was sent to a general institutional contact email address. Where internal referrals were made, the individuals referred to were approached regardless of their group's size, assuming that they have insight on the entity and/or institutional level.

2.5. Interviews and Data Analysis

The interview questions were developed in consultation with all stakeholders involved in this study, including SDC, to allow for accessing information relevant to the four research questions. It furthermore aimed at, primarily, identifying the internal factors according to the SWOT concept (i.e., strengths and weaknesses) and, secondly, to screen for external factors (e.g., opportunities and threats) in order to give a description of the current trends and strategies of hybrid institutions in Switzerland and to allow for phrasing a set of recommendations to funders of research and/or development projects. The questionnaire was structured into (i) institutional structure; (ii) institutional experience on project level; (iii) funding; and (iv) international best practice with regard to R&S4D (Annex I).

Semi-structured interviews with key entity representatives were conducted from March 2020 to August 2020 by phone or video conference (Zoom or Microsoft Teams). Interviews were conducted in German or English and lasted between 45 and 90 min. Written or oral informed consent to publish the data was obtained from each participant on behalf of the entity prior to the interview. All in-depth interviews with key informants were recorded and transcribed manually into English or German. The German transcripts were translated into English.

A thematic analysis of interview transcripts was conducted manually based on the Framework Method [25], guided by the main questionnaire categories, using an Excel sheet. Deductive coding was applied first to identify and group content according to the main questions. Thereafter, inductive coding was used to identify emerging themes within each question. Based on the screening/inductive nature of the study and the in-homogenous and relatively small group of respondents and entities, no quantitative/statistical analysis was conducted.

3. Results

3.1. Participating Entities in Switzerland with Double-Competency in R&S4D

Of 67 entities and individuals that were approached, 23 persons were interviewed representing 18 different entities at 14 different institutions in Switzerland (Table 1) as well as the Swiss Academies of Arts and Sciences.

Table 1. Swiss research entities with double-competency in research and services for development (R&S4D) represented in this study.

Institution	Entity	No. of Staff at Entity	Research Foci
ETH Domain			
École polytechnique fédérale de Lausanne (EPFL)	Cooperation and Development Centre (CODEV) [a]	28	Energy, sustainable habitats, disaster risk reduction, information and communications technology, MedTech
École polytechnique fédérale de Lausanne (EPFL)	Excellence in Africa Initiative (EXAF)	4–6	Diverse
Swiss Federal Laboratories for Materials Science and Technology (Empa)	Technology and Society Laboratory (Empa TSL)	12	Waste and secondary resources management, circular economy
Swiss Federal Institute of Aquatic Science and Technology (Eawag)	Department Sanitation, Water and Solid Waste for Development (Sandec)	15–25	Water, sanitation and hygiene (WASH), waste research
Swiss Federal Institute for Forest, Snow and Landscape Research (WSL)	Swiss Federal Institute for Forest, Snow and Landscape Research (WSL)	500	Forrest, snow and landscape research
Swiss Federal Institute of Technology (ETH)	Department of Environmental Systems Sciences—Transdisciplinary Lab (USYS TDLab)	10–15	Transdisciplinary platform
Swiss Federal Institute of Technology (ETH)	Institute for Environmental Decisions (IED)	10–12	Climate modelling
Universities of Applied Sciences			
University of Applied Sciences Bern	HAFL Hugo P. Cecchini Institute	[b]	Agricultural, forestry and food sciences
University of Applied Sciences and Arts of Southern Switzerland (SUPSI)	Centre for Development and Cooperation	28	WASH, health, migration, habitat and energy
University of Applied Sciences and Arts Lucerne (HSLU)	Competence Center for Regional Economics (IBR)	19	Regional economics
University of Applied Sciences and Arts Western Switzerland (HES-SO)	International Research Programme "Entrepreneurship and Appropriate Technologies for Developing and Emerging Countries"	NI	Diverse
University of Applied Sciences Zurich (ZHAW)	Zurich University of Applied Sciences (ZHAW)	>3000	Diverse
University of Teacher Education Zug (PH Zug)	Institute for International Cooperation in Education (IZB)	8–12	Educational research
Cantonal Universities and affiliated Institutions			
University of Basel	Swiss Tropical and Public Health Institute (Swiss TPH)	800	Biological, epidemiological and medical sciences
University of Basel	Swiss Centre for International Health (SCIH), Swiss TPH	50–100	Health systems support, health service delivery
University of Basel	swisspeace	55	Mediation, dealing with the past, statehood
University of Bern	Centre for Development and Environment (CDE)	100–110	Land resources, governance, climate change, economies
Geneva University Hospitals (HUG)	Division of Tropical and Humanitarian Medicine	30	Non-communicable and neglected tropical diseases, One Health

[a] CODEV was dissolved in December 2019 and its MedTech program became the "EssentialTech Center"; [b] virtual institute with approximately 50 associated persons that remain officially in their divisions; ETH, Swiss Federal Institute of Technology; NI, no information available.

Across the participating entities, broadly four main types of structures pertaining to R&S4D were described (Table 2) mostly based on their level of service activity. Eleven main types of services were stated to take place across the entities, namely (i) project implementation services/consultancy/technical support; (ii) implementation research; (iii) policy advice; (iv) organizational assessments; (v) economic evaluations; (vi) teach-

ing and training (Massive Open Online Courses; MOOCs); (vii) pedagogic consultancy (curriculum development); (viii) infrastructure building; (ix) expert opinion; (x) context analysis/portfolio reviews; and (xi) mediation.

Table 2. Types of research and service for development (R&S4D) entities in Switzerland.

Relative Level of Services	Structure of Entity	Entities
Low	Research is clearly prioritised over services. Only teaching, training-related services or minor short-term assignments (e.g., expert opinions) are being conducted	CODEV, EXAF, WSL
Low–medium	Research and services are being conducted but research is prioritised. Researchers are employed to do both and often contribute with research expertise when involved in services	Eawag/Sandec, USYS TDLab
Medium–high	Research and services are conducted at a similar priority. The research spectrum ranges from applied to basic. There are three different staff profiles: (i) researchers; (ii) consultants; and (iii) hybrids doing both	
	• Research and services, including staff, are separated into different departments; hybrid may be in research or service department	Swiss TPH
	• No structural separation of research and services. All staff is under the same administration	CDE, Division of Tropical and Humanitarian Medicine, Empa TSL, IZB, swisspeace
High	Research and services are conducted at a similar priority. In addition, the research focuses on applied research. Often, staff members work by a combined approach. Per statutes obliged to offer services as part of their educational mandate *	Centre for Development and Cooperation, ZHAW, HAFL Hugo P. Cecchini Institute

* Universities of Applied Sciences and Arts or entities within.

3.2. Strengths and Opportunities of R&S4D Double Competency

Pursuing both research and services routinely at the same entity was noted to (i) lead to synergistic effects on projects and programs, while both areas mutually re-enforcing each other in quality and applicability; (ii) on entities by enhancing the profile, network and range of funders; and (iii) on resource use, with a share of partnership networks, administrative support and staff. According to the representatives of Swiss entities, the benefits derived from combining R&S4D at the same entity take place on four different levels; namely (i) individual; (ii) project; (iii) entity; and (iv) sustainable development.

3.2.1. Individual Level

Conducting R&S4D at the same entity fosters people with double competency enabling them to (i) apply the most robust method based on the best evidence base to both R&S to achieve the objective; (ii) acquire and maintain research-level objectivity and a structured workflow; (iii) operate in an international, multilingual, multisector and, often also, multidisciplinary area; (iv) learn how to interacting with a multitude of different partners; and (v) conduct project coordination/management internationally. In addition, at the UAS, where staff applies a combined approach on a day-by-day basis, especially within Switzerland (and more exceptionally in LMIC settings), they are being acquainted to work in different and sometimes contrasting settings and increasing their sense for bi-directional innovation. Double competencies, therefore, render individuals highly employable and open up a broad and interesting spectrum of opportunities, especially at NGOs, multi-lateral organizations, governments and the private sector (Box 1).

> *"Sandec employs many young people as scientific assistants directly after their MSc without work experience. When they work with Sandec, they gain research related skills (e.g., objectivity and structured workflow), but they also learn very strongly how to interact with partners and how to coordinate and manage projects and field work with partners. That is what NGOs like—young people with relevant 3–5 years of experience*

who can get started straight away with all desired skills in development that you would
otherwise gain within another NGO".

(Representative, Sandec)

It was further noted that research-oriented individuals could benefit from being based at an entity with double-competency, by piggy-backing on services with a research component opening new avenues to publishing and to gaining visibility. New avenues may also open up with regard to funding opportunities. Indeed, multiple interviewees emphasised that there is a wealth of novel funding options for R&S relevant for the 2030 Agenda, which may affect the individual as well as the institutional level.

3.2.2. Project Level

Benefits of a research component to project implementation were named as (i) enhanced quality of products within the project implementation area owing to methodological rigour; (ii) researchers being at the forefront of new information can support the continuous optimization of programs; and (iii) scientists can get readily involved with their in-depth knowledge if need be (e.g., context-specific or domain-specific knowledge, cost-effectiveness and health impact). It was repeatedly emphasised that development cooperation projects are often reluctant to take up research insights in their design and implementation activities.

"Some implementation programs continue on what has been done for 20 years not
adapting to the newest insights and developments".

(Representative, Empa TSL)

Services, in contrast, can significantly shape research proposals and research trends to make them more relevant to local and contemporary contexts.

"Ebola, SARS, COVID-19—the whole stimulus that one has to do surveillance-response
in research, was by public health action and not academics . . . Many development needs
have, in principle, nothing to do with science but they are now shaping scientific questions".

(Representative, Swiss Academies of Arts and Sciences)

In addition, research is often arranged around program implementation and in the same setting, benefiting from knowing the setting, partners, problems and offering some continuity and comprehension to the country. Individuals acquainted with service mandates often speak multi-sector languages and have connections locally that they can leverage also for research projects.

3.2.3. Entity Level

Three main areas benefit from in-house double competency on R&S4D, namely (i) funding and partners; (ii) share of resources; and (iii) visibility. With regard to funding and partners, services were perceived to be a source of income for the sustenance of an institution. Having the capacity to do both offers also strategic flexibility to move between R&S activities in response to the contemporary economic/political and funding climate. Having R&S4D double competency at the entity level brings added value in many cases, even where a research component is not prioritized by the funder, by having scientific experts at hand to improve the performance of a given project and disseminate outcomes in the academic sphere.

"If you look at the institute in purely economic terms, than the services sector is more
lucrative. You can move back into operating in the black more quickly with service
activities than with research activities. This is a good temporary strategy if the aim is
purely financial at any point in time".

(Representative, IZB)

The benefit of shared resources between R&S4D domains pertained to partnership networks, staff, and knowledge. The share of partnership networks allows for efficiency and

continuity of activities and partnerships utilising contacts and partners that have already been established and proved reliable in the past. Moreover, opportunities in both R&S4D can be seized to continue activities in a given setting, therefore consolidating partnerships, capacity building, and impact. A pool of known and R&S4D competent people, on the other hand, was suggested to allow for more flexible and versatile teambuilding for projects and reaction to calls and therefore to broaden funding opportunities. A unique scenario was encountered at Swiss TPH, the only entity assessed in Switzerland that separates R&S4D by departments. The service department seems to benefit here from the opportunity of recruiting individuals with highly relevant research skills internally.

Knowledge was the third mentioned resource shared between R&S4D internally. The internal information flow was stated to allow for cross-fertilization of departments and mandates. A link between research, services, and teaching was deemed important, especially at the UAS.

> "*Often, through services, we know about projects and from there sometimes we have topics that come up for research for our Master students, making the link between services, applied research, and teaching*".

> (Representative, HAFL Hugo P. Cecchini Institute)

Lastly, visibility of the entity was deemed an important benefit of having R&S4D at the same entity. This was especially pertinent at Swiss TPH, where R&S activities are separated by department. A mutual benefit was expressed in the external presentation of an entity. Research can state that there is in-house expertise available on implementation, while the service departments can refer to strong research backup in-house. Having the whole innovation to implementation cycle gives an entity an edge with funders knowing that this whole range of expertise can be covered by a single institute.

When asked about the benefits of having R&S4D double competency at LMIC institutions, specifically, the suggestions largely overlapped with those reported for Switzerland. However, some additional benefits were mentioned for Swiss entities when collaborating with an LMIC institution with double competency. The involvement of LMIC research partners over consultants in implementation projects was, e.g., seen as beneficial by some of the Swiss interviewees for the international partners that had experienced access to better educated and/or skilled collaborators and better quality work. At the same time, it would allow international entities to reduce their overall costs by transferring a larger proportion of the work package to their LMIC partners. Another advantage for international partners was mentioned explicitly pertaining to conflict settings. Here, working with universities with practical orientation was deemed especially valuable for strengthening the role of universities in conflict transformation processes.

> "*Advantage of integrating local universities is that they have a large degree of thematic and sectorial expertise. You have direct access to students which are often the driving/executing forces—they are the ones that go to checkpoints, demonstrate and act as change makers in settings where all other institutions have lost their legitimacy*".

> (Representative, swisspeace)

3.2.4. Level of Global Sustainable Development

It was noted that many academic institutions across the globe are operating in silos having no or only very little multisector connection. However, research and academic institutions, especially those that are operating close to implementation could help to achieve the goals outlined in the 2030 Agenda, by opening up, closing the research to the implementation cycle at the institutional and funding level and offering alternative career structures besides the mono-disciplinary path. Entities that work at the interface of R&S4D with double competency in-house are well placed to give rise to the potential benefits of enhanced R&S4D interaction, increasing the quality and efficacy of services, and generating scientific knowledge that has a practical use. Such institutions also have the ability to use both angles (R&S) to help to maintain a partnership and to continue

activities in a given setting. Above all, having R&S4D competencies at the same entity can give rise to people with double competencies (or triple when education/teaching activities are included) with qualifications highly relevant in the sustainable development domain: (i) ability to apply the most robust methods based on the best evidence to get the success/answers in both implementation and research; (ii) ability to operate in a multidisciplinary, multisector and multi-stakeholder environment; and (iii) ability to act as a broker from project to global level.

> *"Conversations and first stage co-design of projects are often led by "hybrid" persons taking over a bridging function to bring persons from both sides [research and services] on board. Hybrid persons often foster connections between departments and mandates, i.e., research and development, services, and education".*

> (Representative, IZB)

Increasing the proportion of research institutions with double competency may therefore foster institutional, national, and international collaboration in the support of local and global sustainable development.

3.2.5. Weaknesses and Threats

Potential negative effects by synergizing R&S4D at entities were flagged to research, services, and individuals (Box 2). Four main themes emerged; first, the risk of acquiring bad habits that affect research was named due to a loss in objectivity and flexibility and cutting corners under time pressure. The chief concern was that services might replace science altogether rather than complementing it. Second, risks were pointed out for services by research draining resources, blocking implementation progress by unrealistic demands and reluctance to find common ground. The need to compete against consultancy companies, that might be better resourced to respond to a call quickly, was identified as another key challenge. Third, risks and challenges were pointed out that apply to aligning R&S, namely, the differences in quality and rigour, demands, measures of success, and timelines. Moreover, it was deemed difficult to get people with the necessary double competency. Fourth, a lack of career paths and positions for hybrid persons in Switzerland became evident.

> *"Most of us have been working here for more than 10 years. We stay because we have a good employer. The activities we are doing are at the margin of what a university hospital in Switzerland is supposed to do. The university hospital exist to care for the patient of the canton first. Consequently, there is no institutional career path for us. However, we are dedicated people and that is probably why people are not moving. It is not like any other job".*

> (Representative, Division of Tropical and Humanitarian Medicine)

> *"Often people are staying at swisspeace for longer periods because they can do both [research and services] and do not need to decide. swisspeace is known for this combined approach and offers doing both activities on a high level. It is therefore a very attractive place for mixed-approach people that are driven by dedication to context. There are not many alternative employers in Switzerland. The one thing that is missing at swisspeace is a clear career path—you can't really move up the career ladder".*

> (Representative, swisspeace)

Box 1. Strengths in combining research and service for development (R&S4D) at Swiss research and academic institutions.

Strengths
Benefits to Individuals

• Individuals with R&S4D double capacity are highly employable, and a broad and interesting spectrum of opportunities opens up, especially at NGOs, multi-lateral organisations, governments, and the private sector
 • Research-oriented individuals can further benefit from being based at an entity with double-competency, by piggy-backing on services with a research component opening new avenues to publishing, funding, and to gaining visibility
 Benefits to Projects
 • A research component can enhance the quality of products within project implementation, support the continuous optimization of programs and assist in generating a context-specific, cost-effective, and methodologically sound intervention
 • Services can significantly shape research proposals and research trends to make them more relevant to local and contemporary context
 • Research is often arranged around program implementation in the same setting (and vice versa), benefiting from knowing the setting, partners, problems and offering some continuity and comprehension to the country
 Benefits to Entities
 • Increase in funding opportunities
    ◦ Services can be a source of income for the sustenance of an institution
    ◦ Strategic flexibility to move between R&S activities with the contemporary economic/political and funding climate
    ◦ Increased competitiveness by added competency
 • Share in resources
    ◦ The share of partnership networks allows for efficiency and continuity of activities and partnerships utilising contacts and partners that have already been established and that have proven reliable in the past
    ◦ A pool of known and R&S4D competent people allows for a more flexible teambuilding for projects and reaction to calls broadening opportunities
    ◦ Share of information and maintaining internal information flow allows for cross-fertilization of departments and mandates
 • Visibility of an entity increases in either domain having R&S4D at the same entity
 Benefits to Sustainable Development
 • Entities working at the interface of R&S4D seem the best placed to give rise to the potential benefits of a combined approach. Increasing the proportion of such institutions may increase the quantity and quality of relevant work
 • Ability to utilize both lines of activity to help to maintain a partnership in a given setting
 • Entities with R&S4D activities can give rise to people with double competencies with qualifications relevant to the sustainable development domain

Opportunities
• The Universities of Applied Sciences have the largest proportion of hybrid staff in Switzerland; yet, they operate mostly on national level owing to their mandate and a lack of access to funding for international projects; they therefore represent a largely untapped pool of highly skilled R&S4D professionals   • There is a wealth of novel funding options for R&S4D relevant to the 2030 Agenda that could be opened up with increasing ease of access to a diversity of individuals and institutions

Box 2. Potential weaknesses and threats when synergising research and service for development (R&S4D).

Weaknesses
Risks to Acquiring Bad Habits in a Service-Minded State that Affect Research
• Losing objectivity because mandate already dictates what the results should be, contradicting scientific approach
• Service mandates are often conducted under extreme time pressure enforcing cutting corners making quality suffer
• Creativity may suffer when always terms of references are being followed. Research needs flexibility upon dead ends and sense for adaptation, which is in conflict with the nature of services
• Sometimes with hybrid institutions in low- and middle-income countries, research quality is not guaranteed
• Danger of services replacing science rather than complementing it Risks that Research Negatively Affects Services
• Research component with questionable value—often dictated by funder—may drain resources from the actual service implementation
• Researchers may have unrealistic demands impairing the efficiency of an implementation project or blocking progress
• Researchers sometimes fear for their habitus and are therefore reluctant to give in to this different direction/common ground—there can be a certain unwillingness to deal with real-life issues
• Need to compete against consultancy companies that might be better resourced to respond to a call quickly Risks and Challenges to Aligning Research and Services
• Different levels of quality/rigour, demands, measures of success, and timelines
• Difficult to get people with the necessary double competency
Threats
Lack of Hybrid Career Path and Jobs in Switzerland
• It is difficult to stay in research if not fully committed. Adding services activities, researchers often find themselves between the high demands of both worlds but without acknowledgment of that transdisciplinary expertise and without career path. There are no personal career development grants for "hybrid" persons
• Lack of job opportunities for individuals who want to keep pursuing a mixed R&S4D approach

3.3. Strategies to Maximise the Benefits of R&S4D Double Competency and Areas of Improvement at Swiss Research Entities

Individual, as well as entity level strategies, were identified that sought to maximise the benefits of R&S4D double competency (Box 3). Most of those referred to staff arrangements, e.g., employing (more) hybrid persons who take over a bridging function between research and project implementation activities, and persons.

"Hybrid persons mediate, while purely service/research persons are necessary to inform and provoke. People who are solely in research or services are sometimes very provocative but sometimes they stir things up in a positive way. If you only employ hybrid persons, you create a form of monoculture producing a system without the possibility to accommodate individuals thinking outside the box. At the moment, however, there are not enough people in hybrid function and too many that polarize".

(Representative, IZB)

In contrast to CDE, swisspeace and Sandec that are offering hybrid positions and possibilities to move between research and service career track (CDE), at Swiss TPH, hybrid positions are scarcer, which may be due to the institutional career structures and the fact that R&S are separated by departments.

"A good arrangement would be to have people that work certain % in services and certain % in research; however, the career structures [referring to the academic career demands] currently do not allow".

(Representative, Swiss TPH)

Yet, this very separate structure was deemed ideal by other R&S4D institutions as the expectations and profitability are not the same, neither the same skills nor capacities (see also Box 2).

Box 3. Individuals' and entities' strategies to conduct and to benefit from research and service for development (R&S4D).

Individuals
• Establishing relationships and dialogue with funders to allow for discussing the design of a program/project rather than following terms of reference
• Approaching funders with ideas outside the tender arena
• Applying for technical assistance projects and do them at a scientific rigour that allows for publishing the outcomes
Research Entities
• Build up globally competitive expertise within a focal area (Sandec, Swiss TPH and swisspeace)
• Having strong backing from the leadership and leadership that values impact measures as much as academic measures (Division of Tropical and Humanitarian Medicine, Sandec and Swiss TPH)
• Having R&S4D at the same institutions but separated by departments (Swiss TPH)
• Employing persons who are already operating in the service arena and bring their connections with funders into the entity (IBR and IED)
• Offering hybrid positions to enable a continuation of research activities besides services (CDE, Division of Tropical and Humanitarian Medicine, IZB, and swisspeace)

Other areas of improvement pertained to the role of research and entity structure. Especially the desire to increase research capacity and demand to the institute to promote and support having more publications was expressed. Regarding structural presentation, one entity (HAFL Hugo P. Cecchini Institute) had recently become a virtual institute in order to be stronger in project acquisition and to increase interdisciplinary research internally, increased visibility internally and externally. At the same time, the organization chart of HAFL remained the same. Another change that had been envisaged, by the Division of Humanitarian and Tropical Medicine at some point, was the creation of a spin-off allowing to get around administrative difficulties associated with the status of a

public hospital (e.g., manage funds independently, open a bank account for a project and have more flexible work contracts than civil servants), while still allowing to benefit from the link with the Geneva University Hospitals.

In summary, there are strategies that are widely applicable to R&S4D entities, such as employing hybrid staff to bridge between the domains or bring in new funding sources and fostering a combined approach by the leadership. On an individual level, estaablishing a dialogue with the funder and bringing in their own ideas and tweaks seemed to deliver mutually satisfying outcomes. Other strategies, however, have to be tailored around the strategic plans of each entity such as the domains of work, questions of affiliation and departmentalization of functions.

3.4. Funding for R&S4D

The demands to funders as expressed by the participating R&S4D entities and their representatives covered a wide range of areas starting at covering the entire innovation to implementation project cycle (Box 4). Validation and implementation science were hereby deemed key to closing the cycle and innovations that are not being validated in different contexts were seen as a loss. A general lack of research funding for "exit phases" of a project was also stated to be counterproductive to applied/implementation research. On the contrary, obtaining research funding from a development cooperation partner seemed a "hard sell" with the initiative always coming from the applicant. In addition, the funding structure was deemed complex for entities active in R&S4D.

> *"When it comes to applied/implementation research internationalization, you need com-bined support from SDC [Swiss Agency for Development and Cooperation], from SECO [State Secretariat for Economic Affairs], and from SERI [State Secretariat for Education, Research and Innovation]. So potential federal support is very heterogeneous, and proba-bly many directors of schools and especially individual research staff may feel it is too complicated. Especially if they have no previous international exposure and they have to start from scratch".*

> (Representative, HES-SO)

Another issue emphasised by several participating entities pertained to access issues to Swiss R&S4D funding (Box 4). Especially for the UAS and/or entities without a track record in research, it seemed extremely difficult to maintain, increase or break into this domain. Indeed many of the previous schemes that have tried bridging between research and implementation (e.g., National Centres of Competence in Research, NCCR North-South; Research for Development, R4D; and the Swissuniversities Development and Cooperation Network, SUDAC) were perceived to be reserved for a closed club of applicant entities in Switzerland. Moreover, it was perceived that in today's Swiss landscape, those that are mostly receiving funds are those that are primarily concerned with publishing and creating new knowledge through research. Excellence in science and above all publications by Swiss authors seemed still higher valued than doing science for a practical purpose and for the benefit of local partners.

Box 4. Recommendations to funders to maximise the impact of research and service for development (R&S4D) pursued by Swiss research and academic institutions.

More Opportunities for R&S4D Hybrid Work Are Needed
- From funders of development cooperation, a greater openness towards including a research component is desired to enhance the quality of projects. The least, there must be scope for a comprehensive review of the literature during the design stage to operate by the latest evidence and best practice and to avoid stagnation, repeating mistakes, and reproduction of work   - Funders of development cooperation and decision-making boards should represent researchers to offer scrutiny on whether the latest evidence and best practice are taken into consideration. In addition, they would move the balance towards proposals that do feature a research component and/or the necessary rigour of project designs   - More funding opportunities that offer a combined R&S4D approach (including paired schemes between funders of research and those supporting development cooperation) are desired to allow for establishing a coherent project without the need to apply to different sources for different aspects of the work   - In addition to university partners, funders should demand implementation partners, policy- and/or decision-makers to be involved as co- or principal investigators to bring science to impact   - Widen the applicant network within Switzerland. Some entities in Switzerland, especially among the Universities of Applied Sciences and Arts and/or entities that are lacking visibility in research are feeling marginalized by Swiss funders   - Seek a continuous dialogue with the research entities and involvement from the beginning throughout the design, implementation and evaluation process   Better Support Individuals in Their R&S Double Function   - Offer special funding schemes for individuals who wish to remain at the R&S4D interface and/or change the measures for applicants to research funding. Greater weight should be given to the quality of the entire research output (e.g., publications, working with stakeholders, public communication, datasets, software, patents, conference papers, awards and prizes [41]   Give More Consideration to Local Partners   - Invest institutional funding in LMIC partners to maintain the structures created and allow for continuity of high-quality work   - Demand matched funding from LMIC partners even if minor (e.g., local accommodation and transport). This changes the perception of commitment   - Ethically sound research partnerships with clarified responsibilities, co-design of projects, mutual learning and fair distribution of merits should be a condition to research funding [42,43]

4. Discussion

4.1. Institutional R&S4D Strategies

There is no "one size fits all" approach in co-organizing R&S4D activities, as revealed by the suite of in-depth interviews with key R&S4D institutions in Switzerland participating in the current study. Having a departmental separation of R&S activities seems to allow for higher visibility of the service entity, especially, and an optimal administrative and legal framework with autonomous management of funds and project accounts and elevated flexibility in contracting. On the other hand, those institutions that do not feature such departmental boundaries, clustering all staff categories around themes or projects, may be more accommodating to hybrid careers, looking at the numbers of persons with hybrid function at Swiss TPH (<10%) vs. swisspeace (~33%), for instance.

4.2. Strengths and Weaknesses of a Combined R&S4D Approach

Similar strengths derived from having both R&S4D in-house were observed across the different types of entities, precipitating on four different levels, i.e., the individual, project and entity level and with regard to international sustainable development. Individuals benefit from a diversification of skills and a high employability in a variety of non-academic sectors, including government, NGOs and the private sector. Projects and programs benefit from methodological rigour and high quality of implementation and products, while research can be shaped by services to render it more relevant to the local and contemporary context. Arranging research and program implementation in the same setting seems to be a particularly powerful strategy, allowing one to draw from mutual resources (knowing the setting, partners, and problems) and to choose from a broader range of options to maintain activities over longer periods in the same area. The latter therefore enables consolidating partnerships, capacity building, and impact, leading to further benefits to the entities involved and sustainable development.

Besides the share of resources, the main benefits to entities that have both R&S4D in-house were named as higher flexibility concerning funding and partners. A business model based on institutional double competency in R&S4D seems indeed exceptionally resilient in the current global geopolitical climate allowing for versatility and flexibility with regard to internal resource management and spectrum of international partners and funders. In face of the high degree of economic and geopolitical insecurity currently imposed by the COVID-19 pandemic, the R&S4D hybrid model seems viable so far, contrasting the experience of many institutes of higher education in English speaking high-income countries that are heavily reliant on revenues from foreign students [44–46].

Despite the relative resilience of R&S4D hybrid entities in the contemporary climate, some weaknesses were named, albeit mostly pertaining to LMICs. In particular, a loss in research quality was lamented in hybrid institutions in LMICs and a danger to replace science with services rather than complementing it. Establishing more attractive funding structures and career pathways for LMIC researchers would be an effective measure to counteract such a shift, however. If a high level of quality for R&S4D can be established, entities that work at the interface of R&S with double competency in-house seem the best placed to act as sustainable development factories and incubators. They already do so, by conducting activities at the highest level of effectiveness, quality and relevance in the name of the 2030 Agenda and by giving rise to individuals that work, at the time, scientific and pragmatic, that are able to operate in a multidisciplinary, multisector and multi-stakeholder environment, and that can act as a mediators at the project as well as at the global level.

4.3. R&S4D Careers and Funding

Considering the sum of benefits, increasing job opportunities and creating a more streamlined career path for researchers who want to combine academic research with work in another sector would bring much value to the academic sector in Switzerland. The experience documented demonstrates how attractive, yet scarce, hybrid positions are for those who are working in such positions. In face of this widespread deficiency,

those Swiss institutions that do offer R&S4D hybrid working opportunities seem to see little turnover among their hybrid staff, not the least because of a lack of other equivalent opportunities. Paradoxically, this lack of opportunity coincides with a looming exodus of early-career researchers, considering their options in other sectors [47–49]. This comes at a time when the need for researchers along the whole spectrum—basic science to implementation science—and research-minded individuals with an ability to work along evidence base is rapidly increasing, and sustainability science—a field in its own right—is emerging. Still, the current academic and research environment often discourages multisector engagement [11]. The academic and research sector could foster more of this type of engagement by accommodating combined and non-linear approaches (e.g., individuals who pursue research and non-academic activities side by side and persons with significant work experience in another sector who move into academia) besides the classic mono-disciplinary, linear academic career path. In addition, institutions could create and encourage positions that allow hybrid persons to thrive in both academic research and the practical use and application of knowledge generated. Here, it would have to be assured that the academic aspirations of those individuals are met in hybrid positions. Funders can accelerate this trend by offering career development grants to individuals who wish to work at the interface of R&S4D and/or by changing the measures for applicants to research funding [41]. In the United Kingdom, for instance, the Global Challenges Research Fund (GCRF) is supporting national universities and research institutions in "undertaking challenge-led research" and increase the impact of research. To do so, the GCRF has pledged to establish a more supportive environment for the assessment of interdisciplinary and transformative research proposals [50]. The UK-based Wellcome Trust, among the world's largest nongovernmental funders of science, has pledged this year to enlarge its focus to include goal-oriented research [51].

With regard to funding for the conduct of R&S4D activities as such, the experiences documented in the current work were mixed. While some interviewees stated that there was a wealth of funding for 2030 Agenda-related areas, others complained about a lack of access to national—let alone international—funding as well as the fragmentation of funding sources when R&S4D approaches needed to be combined for a given project. The former group consisted of entity representatives that are well integrated into the national R&S4D scene with already existing ties to national and/or international funders on personal and/or entity levels. Most of the time, those were the ones in a position to negotiate over the design of a given project with the funders or approach them with ideas outside the regular calls and tenders. The latter group consisted of entities that struggled to gain access to national funding, often because of a lack of research history, finding it difficult to build up a critical amount of relevant experience. This applied particularly (but not exclusively) to the UAS.

4.4. Limitations

It was beyond the scope of this study to conduct an exhaustive mapping of the Swiss R&S4D landscape; however, based on consultations with SDC and KFPE, we have a high degree of certainty to have inquired with most of the key entities in Switzerland that do feature both R&S4D. This work does not feature the point of view of the many LMIC partners of the entities involved as it would demand separate national or at least regional assessments.

5. Conclusions

Taken together, Switzerland offers an interesting case of how to establish a large pool of highly capable and varied science and engineering workforce by offering different educational pathways and a close alignment with its private sector. Identifying and characterizing Swiss research institutions that co-host R&S4D activities, strengths were reported on staff, project, and entity levels and regarding global sustainable development. Weaknesses concerned the project level. A lack of career paths and positions for individuals

aiming to pursue academic research alongside services was seen as a threat, while the current funding climate and the R&S4D capacity of the UAS represent opportunities.

In areas where a combined approach between R&S4D is desired, Switzerland could leverage strength and enhance synergies. It could do so by supporting the creation of more hybrid positions nationally and by offering a clear career path that allows individuals to continue academic research part-time alongside or in combination with service-related work. Interestingly, however, those institutions that feature the highest proportion of hybrid positions—the UAS—have generally the least access to national (and international) funding for research and international services and are therefore representing an underused resource in R&S4D that should be mobilized. Funders would greatly contribute to increasing the quality and quantity of work important to moving along the 2030 Agenda by seeking more dialogue with relevant institutions, creating more combined funding opportunities, directly supporting individual hybrid careers, and building capacity in LMIC partner institutions. We hereby responded to all study questions describing the main R&S4D entities in Switzerland and the SWOT, and we established some guidance on how the funding of research and/or development projects could be leveraged more effectively to foster hybrid activities.

Focussing here on a first screening of the Swiss R&S4D landscape including the identification of international best practices in integrating a multisectoral approach and fostering hybrid careers in academic institutions might provide an avenue for funders and institutions globally that aim at accelerating R&S to tackle some of the most pressing global challenges.

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