



# **Towards Institutionalised TVET Research in Costa Rica—Empirical Analysis on Status, Needs, and Challenges**

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## Towards Institutionalised TVET Research in Costa Rica—Empirical Analysis on Status, Needs, and Challenges

Hacia la institucionalización de la investigación en materia de EFTP en Costa Rica—análisis empírico del estado, necesidades y retos

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**Abstract:** Technical Vocational Education and Training (TVET) in Costa Rica is considered as an important alternative for the insertion of the young population into the labor market. However, despite the increasing importance of TVET there is a lack of institutionalized research activities, so that research efforts on TVET mainly remain in the background. The aim of this paper is to present and examine the level of institutionalization of TVET research in Costa Rica and the associated needs, challenges, and demands. Therefore, qualitative research, with an exploratory scope, was conducted between December 2022 and June 2023, for which a literature review on TVET research and semi-structured interviews with sixteen experts were carried out. The results revealed, that from 2020 to date, there has been an increase in the number of research activities in TVET and in the number of publications in Costa Rican journals. Nevertheless, TVET institutions in Costa Rica show low capacities in terms of personnel and financial resources to conduct TVET research. The main conclusion is that the level of institutionalization of TVET Research in Costa Rica is in its infancy, but has potential for growth, for which it is necessary to establish public TVET policies that include TVET research.

**Key words:** TVET research, institutionalization of TVET research, Costa Rica

**Resumen:** La Educación y Formación Técnica Profesional (EFTP) en Costa Rica es considerada como una importante alternativa para la inserción de la población juvenil en el mercado laboral. Sin embargo, a pesar de la creciente importancia de la EFTP existe una falta de actividades de investigación institucionalizadas, por lo que los esfuerzos de investigación sobre la EFTP permanecen principalmente en un segundo plano. El objetivo de esta investigación e trabajo es presentar y examinar el nivel de institucionalización de la investigación en EFTP en Costa Rica y las necesidades, retos y demandas asociadas. Para ello, se llevó a cabo una investigación cualitativa, de alcance exploratorio, entre diciembre de 2022 y junio de 2023, para lo cual se realizó una revisión bibliográfica sobre la investigación en EFTP y entrevistas semiestructuradas a dieciséis expertos. Los resultados revelaron, que desde el año 2020 a la fecha, ha habido un incremento en el número de actividades de investigación en EFTP y en el número de publicaciones en revistas costarricenses. Sin embargo, las instituciones de EFTP en Costa Rica muestran bajas capacidades en términos de personal y recursos financieros para realizar investigación en EFTP. La conclusión principal es que el nivel de institucionalización de la Investigación en EFTP en Costa Rica es incipiente, pero tiene potencial de crecimiento, para lo cual es necesario establecer políticas públicas de EFTP que incluyan la investigación en EFTP.

**Palabras clave:** investigación en EFTP, institucionalización de la investigación en EFTP, Costa Rica

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## 1. Introduction

Costa Rica is recognized as one of the Latin American countries that invests the most in education. According to the World Economic Forum's Global Competitiveness Report 2016-2017, Costa Rica's education system ranks 35<sup>th</sup> in the world and has one of the highest rankings in Latin America. However, most students in Costa Rica leave school with a weak foundation for work, contributing to social concerns about low productivity and skills shortages (Organisation for Economic Co-operation and Development [OECD], 2017, p. 14), compounded by the fact that Costa Rica is the OECD country with the highest youth unemployment rate (34.2%) among 15–24-year-olds (OECD, 2023, p. 6). To enhance economic growth, Costa Rica needs a labour force with the competencies and skills demanded by the labour market and a technical vocational education and training (TVET) system that meets this need. At the same time, despite growing attention from the political and economic side, development of theoretical and methodological approaches to TVET and its scientific knowledge is not yet sufficiently occurring. This issue has brought to the fore the demand for more research on TVET in Costa Rica.

Although TVET is considered an important and valuable alternative for the involvement of the young population in the labor market, with a growing importance for the society, the relevance of TVET research is not yet established, so research efforts have mostly remained in the background (Alvarado Calderón & Mora Hernández, 2020, p. 1). Baumann & Láscarez Smith (2018) stated that TVET research in Costa Rica is still in its infancy, and there is still no university chair conducting TVET research (p. 28). Nevertheless, it should be noted that TVET research is indeed practiced in Costa Rica, and its importance is increasingly becoming more obvious in educational policy and academic discourse. Nevertheless, although the Costa Rican discourse on TVET has typical elements such as the currently formulated need for TVET research and existing courses of study in TVET teacher education, as well as academic research efforts, this has not yet led to a certain degree of institutionalised TVET research. Therefore, the aim of this paper is to discuss whether and, if so, to what extent TVET research in Costa Rica can be described as institutionalised and what can be characterised as the associated needs, challenges, and demands to further TVET research and its institutionalisation in Costa Rica.

To assess the degree of institutionalisation of TVET research in order to present the status quo of institutionalised (university and non-university) TVET research in Costa Rica and

to derive recommendations for action to strengthen it, this article answers the following research questions:

- a) What is the current status of TVET research in Costa Rica, and what level of scientific institutionalisation has TVET research in Costa Rica achieved?
- b) What are the associated research needs, challenges, and demands for TVET in Costa Rica?

These research questions will be answered by the empirical analyses carried out within the framework of the Costa Rican Vocational Education and Training project (CoRiVET), funded by the German Federal Ministry of Education and Research. This project aims to actualise the current curriculum on teacher qualification for TVET at the National Technical University (UTN) and to further institutionalise TVET research. In order to fulfil this last objective, a diagnosis of the current state of research on TVET was carried out, which provides updated information to detect, for example, in which sub-themes of TVET it is necessary to make greater research efforts in the future, which actors and institutions are currently involved in TVET research, and the types of TVET research present in Costa Rica. For this purpose, a qualitative study with an integrative literature review and semi-standardised expert interviews of Costa Rican actors was conducted. In this paper, we will first present a theoretical framework on the institutionalisation of research and the development of scientific disciplines. Furthermore, some remarks on TVET research with a corresponding definition of what this entails and its forms such as basic and applied research will be provided. The theoretical framework is supported by the application of the model of institutionalisation of science offered by Clark (1972), which will serve as an instrument to visualize and characterize the level of institutionalisation of TVET research in Costa Rica. Subsequently, we present a methodological chapter, in which a detailed description of the methodological procedure and the analysis of the results is given. Finally, this paper concludes with a discussion of the results and an outline of recommendations for action to support the institutionalisation of Costa Rican TVET research.

## **2. Theoretical Framework**

### **2.1 Emergence of Scientific Disciplines**

Scientific disciplines can be described as historically determined and thus changing forms of knowledge acquisition and knowledge reproduction (Parthey, 2010, p. 10; Parthey, 2022, p. 142). In scientific disciplines, both the way of asking questions and a preference for certain

methodological approaches are acquired and practised by scientists. This scientific activity is recognized in society and can be institutionally established (Parthey, 2010, p. 10). Disciplines are furthermore forms of social institutionalisation and can be characterised and identified through a homogeneous communication context of researchers; a scientific community; a corpus of scientific knowledge, which is also represented in textbooks; a set of research methods; a specific career structure; and institutionalised socialisation processes, which go hand-in-hand with the selection and indoctrination of young scientists (Stichweh, 2013, p. 17). According to Reinisch (2009), research disciplines are also communication communities of specialists who hold chairs at universities (p. 1).

But scientific disciplines as a whole can differ greatly. This distinction is based on the area being studied, the theory used by scientific disciplines, the problems to be investigated, and the methodological approaches applied (Parthey, 2022, p. 149). According to Parthey (2022), disciplinarity in sciences can be increasingly differentiated, which aligns with a higher degree of specialisation of knowledge and its articulation. He points out that it can be observed that new scientific disciplines have emerged (and continue to emerge) at universities to the extent that first a chair was created. Secondly, a textbook was written, and thirdly, publications, new journals, and papers were available from researchers in this new scientific discipline (Parthey, 2022, pp. 149-150).

For example, in Germany, TVET research is established as an academic sub-discipline of educational science, characterized by the existence of chairs, study programs, scientific communities, scientific journals, and a corresponding promotion of young researchers. Significantly, the emergence of TVET research as an academic sub-discipline is explained and legitimised by the professionalisation of teacher training for vocational education (Reinisch, 2009). At the same time, however, far-reaching challenges can be identified with regard to the institutionalisation of TVET research in Germany. Van Buer and Kell (2000) argued that TVET research is strongly characterised by multidisciplinary and that there is a great institutional diversity and different research standards. In their elaboration, they pointed out that there is a total of 74 university and approximately 130 non-university institutions that operate within the framework of a wide variety of understandings of TVET research in Germany (Euler, 2018, p. 38). The individual units are often not allocated fixed resources for research, which is why they often have to finance themselves through third-party funding (Euler, 2018, p. 38). One problem discussed is that the existing diversity is less of a network and more of a segmented and

fragmented situation with unspecific connections (Eckert and Tramm, 2004, p. 66; Wissenschaftsrat, 2017, p. 61).

It should be noted that the development of scientific disciplines is associated with specific achievements. These include university chairs, a repertoire of methodological and theoretical standards, promotion of young researchers, and academic journals. At the same time, it should be pointed out that the institutionalisation of science and its disciplines is closely linked to these facets. Which specific factors favour and promote institutionalisation can be visualised in the following chapter with the five stages of institutionalisation of science according to Clark (1972).

## 2.2 Institutionalisation of Research

In order to illustrate the institutionalisation process of research in a more transparent way, this article refers to Clark's five stages of institutionalisation. Clark (1972) described five stages in his contribution to the institutionalisation of science and began by stating that three basic elements are needed for the development of a new (scientific) field. These are (a) a set of coherent ideas and, so to speak, a paradigm; (b) talented people who develop these ideas; and (c) the institutionalisation of basic structures. These elements can be understood as so-called functional imperatives (Clark, 1972, p. 658). To specify the coherent paradigm, he went on to say that it takes into account specific concepts, propositional affirmations that relate concepts to each other, and models that define the nature of the relationships under investigation, followed by conditions that are important for the validity of the paradigm. In this, the paradigm also serves to define the field of research, its boundaries (delimitation), and a possible methodology for empirical research (Clark, 1972, p. 658). The second element is talent, which includes the fact that talent develops in societies and in areas of those societies where cultural and intellectual achievements are primary. This talent then develops in individuals who are educated in high-quality schools and universities that provide a solid general education. However, according to Clark (1972), this is dependent on the third element of institutionalisation of basic structures (p. 659). The third element of institutionalisation consists of five basic elements and has evolved throughout history. These five basic stages of institutionalisation of research are illustrated in Table 1.

**Table 1**  
**Five Stages of Institutionalisation of Research**

<b>Stages</b>	<b>Characterization</b>
<i>The solitary scientist</i>	<ul style="list-style-type: none"> <li>• Individuals with minimal institutional support</li> <li>• Research problems developed informally</li> <li>• Relatively few social relationships among individual researchers</li> <li>• Few common values or institutional norms</li> </ul>
<i>Amateur science</i>	<ul style="list-style-type: none"> <li>• Professional social relationships</li> <li>• Scientific society or professional</li> <li>• Organization</li> <li>• Communication and feedback among colleagues</li> <li>• Research remains sporadic and fragmentary</li> </ul>
<i>Emerging academic science</i>	<ul style="list-style-type: none"> <li>• Full-time positions at universities</li> <li>• University chairs</li> <li>• Still relatively informal network</li> </ul>
<i>Established science</i>	<ul style="list-style-type: none"> <li>• Chairs</li> <li>• Students entering the field</li> <li>• Research is most likely emphasised in lectures and seminars</li> <li>• Adequate research training for the average student only follows the creation of a regular training program</li> </ul>
<i>Big science</i>	<ul style="list-style-type: none"> <li>• Big national and international research community</li> <li>• Advanced training programs</li> <li>• Career options</li> <li>• Leading chairs</li> <li>• Standards</li> <li>• Decentralized regulatory institutions</li> </ul>

**Source:** From Clark (1972).

Clark's (1972) explanations of the five stages of institutionalisation of research clarified the process and the related preconditions of how and when research or research areas can be understood as institutionalised. In this context, the individual stages reveal vivid criteria that can be applied to Costa Rican TVET research in the course of this work in order to obtain a status quo of institutionalisation.



### 2.3 TVET Research and Its Types

TVET research can be characterized by a heterogeneous pool of actors, research fields, and topics. Due to this variety, TVET research has a very broad and increasingly differentiated profile when investigating relationships among occupation, gainful employment, and education (Pätzold and Wahle, 2013, p. 28). It is concerned with the phenomena of education and training that are directly or indirectly related to occupations and the acquisition of (vocational) qualifications. More specifically, it investigates the conditions, processes, and consequences of the acquisition of professional and general qualifications in cultural, political, social, and historical contexts (Lauterbach, 2008, p. 28). TVET research ranges from structural issues of TVET and the transitions among general, vocational, and higher education to questions of historical and regional comparison, for example, micro issues of teaching and learning or the design of innovation, implementation, and transfer processes (Euler, 2018, p. 39). Scientific activities in TVET can be directed at the most diverse action and research fields: for example, to describe the structure and development of specific circumstances, to typologize the variety of manifestations of a circumstance in TVET, to understand the motives and reasons for individual action, to explain causal relationships, to predict or explore possible developments, or to develop innovative concepts for action in a theory-led manner (Euler, 2018, p. 39).

The disciplines and institutions that deal with TVET research are as diverse as the research itself. The subject areas of TVET research can be viewed from educational, didactic, psychological, sociological, or economic perspectives. All of these approaches originate from scientific disciplines that draw on their own traditions, approaches, methods, and epistemological interests (Eckert & Tramm, 2004, p. 55). Thus, in the development of TVET research, there is not only an expansion of its subject area but also a diversification of the places where research is conducted (Böhle, 2013, p. 54). Examples of institutions where TVET research is carried out include universities and other national and international institutions such as the Federal Institute for Vocational Education and Training in Germany, the European Centre for the Development of Vocational Training (Cedefop), and even companies.

TVET research also can be classified between different forms like basic and applied research. Basic research, which primarily serves to expand knowledge for its own sake, has always been attributed to universities (Mowery and Sampat, 2005; Bentley et al., 2015, p. 690). Its experimental or theoretical work is undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use (OECD, 2015, p.29). At the same time, it is argued that academically oriented



disciplinary and autonomous research conducted exclusively within universities no longer corresponds to the central mode of knowledge production and that knowledge produced in the context of application has become a predominant form (Gibbons et al., 1994; Bentley et al., 2015, p. 690). Applied research in TVET, on the other hand, entails looking for principles or models that give an understanding of TVET beyond specific contexts and has direct applications to educational policy and practice (McDonald et al., 1992, p. 8).

To summarize, Table 2 clarifies how applied and basic research can be differentiated and what aspects they have in common.

**Table 2**

***Characteristics of Basic and Applied Research***

<b>Basic Research</b>	<b>Applied Research</b>
<ul style="list-style-type: none"><li>• Defines academic work at most research universities around the world</li><li>• Often funded by governments, universities, and private foundations through grants</li><li>• Evaluated by peers using academic standards</li><li>• Made public through conferences and publications</li></ul>	<ul style="list-style-type: none"><li>• Aims to solve specific individual, organizational, or industry problems</li><li>• Puts basic research into practice to achieve specific predetermined objectives</li><li>• Is often client-driven with commercial objectives</li><li>• Uses existing knowledge or is generating new knowledge</li></ul>

**Shared Characteristics**

- Systematic search for new knowledge
- Often problem based
- Uses accepted research techniques and methods
- Quantitative and qualitative research
- Adheres to ethical and quality standards

**Source.** Victorian TAFE Association (2019), Bentley et al. (2015), McDonald et al. (1992).

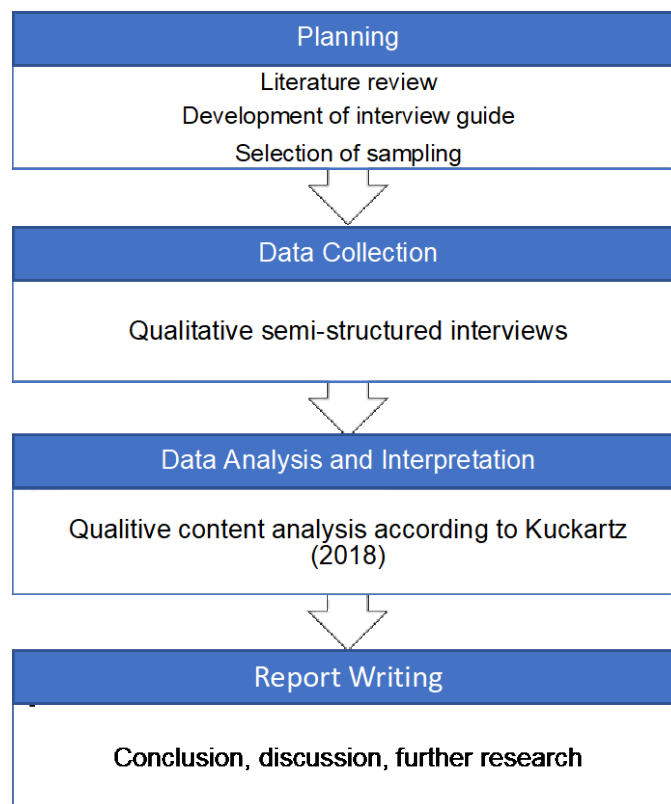
As this chapter illustrates, the field of TVET research is as diverse as its forms and the institutions that conduct TVET research with involvement from a wide range of disciplines and institutions. TVET research can be very basic or aim at direct and applicable research in practice. The topics being researched range from structural questions of TVET and the permeability of the individual educational sectors to didactic questions of teaching-learning arrangements or the transfer processes of TVET.

### 3. Methodological Approach of the study on TVET research in Costa Rica

#### 3.1 Approach

We used the qualitative research approach, which according to Flick (2018) is oriented towards analysing concrete cases in their temporal and local particularity, starting from people's expressions and activities in their local context (p.13). The research design encompasses different stages of the research process between December 2022 and June 2023, including planning, data collection, and data analysis. In the context of the research question, the research design involves planning a study that includes a literature review, development of an interview guide, selection of a sample and data collection through qualitative semi-structured interviews, and analysis using qualitative content analysis according to Kuckartz's (2018) framework (see Figure 1).

**Figure 1**  
**Research Process on Status Quo of TVET Research in Costa Rica**



**Note.** Authors' illustration, 2023.

According to Torracco (2016), integrative literature review is a valuable approach for analysing and synthesising information, particularly in relation to broad research questions, and is especially beneficial for qualitative research. The primary aim of an integrative literature review is to conduct an accurate and structured assessment of empirical, methodological, or theoretical literature, with the intention of identifying areas requiring further research. The integrative research process comprises five distinct stages: problem formulation, literature search, data evaluation, data analysis, and presentation. Comparable to a systematic review, this approach employs a systematic methodology to identify, analyse, evaluate, and synthesise all relevant studies; however, it does not involve statistical synthesis methods (Remington, 2020, pp. 2-3). All documents related to TVET in Costa Rica (published worldwide between January 2000 and June 2023) were considered, and the search for such documents was done in three languages (Spanish, English, and German). Both, formal academic publications (12 peer-review articles) and "grey literature" (25 working papers, reports, books, chapters, papers) were considered in the present paper. The search terms in the three languages were, among others, the following: "technical education," "vocational training," "technical education research," "vocational training research," and "dual training". These terms were also combined with the terms "Costa Rica" and "Central America". Different databases like Wiley, Web of Science, Scopus, Eric, Springer Link, VOCED Plus Australia, VET Repository BIBB, peDOCS, Fachportal Berufliche Bildung and Google Scholar were used in the process of searching for publications on TVET and TVET research in Costa Rica. The findings of the integrative literature review were used to develop a framework to construct an adapted, semi-structured guide for the expert interviews that addresses the results of the integrative literature review and the formulated research questions on the status quo of TVET research and its level of institutionalisation in Costa Rica.

### 3.2 Study Population

The experts were chosen on the basis of contacts generated during the project CoRiVET with Costa Rican TVET institutions and actors. The interviewees are considered experts when they are 'particularly competent as authorities on a certain matter of facts' (Deeke, 1995, pp. 7–8, cited in Flick, 2022, p. 200). We mainly took into account experts/researchers who are directly or indirectly involved in TVET research through, for example, written publications or TVET projects. We used the snowball technique to expand the expert group and the saturation criterion for qualitative sampling was considered. Informed consent was obtained from the

experts. When selecting the sample to be interviewed, we took care to ensure that the experts to be questioned formed a heterogeneous group in order to obtain a broad and comprehensive analysis of the status, actors, needs, and challenges on Costa Rican TVET research. This was done on the basis of academic and non-academic actors in the TVET system and in TVET research. The experts were the following:

- Eight people academically involved in TVET research from state universities
- Seven people who were indirectly involved in TVET research and played a decisive role in the Costa Rican academic and non-academic TVET system
- One expert on TVET research in Latin America

The educational backgrounds of the interviewees, as well as their current occupational fields, were very diverse. For example, some of the interviewees who were currently working on TVET from a scientific perspective had a master's degree in sociology, and others had a degree in education or political science. During the time of data collection, seven of the 16 interviewees had already published on TVET or were working in basic and applied TVET research fields.

### 3.3 Collection Technique

Next to the literature review we used 16 qualitative, semi-structured expert interviews in Costa Rica between January and April 2023. To obtain information from the experts, the semi-structured interview was selected as the information gathering tool. In this sense, Flick (2022, p. 3) indicates that “doing interview research is a widespread practice in social science and in particular in qualitative research”. Semi-structured expert interviews are particularly suitable for supporting the explorative character of a study (Magaldi & Bergler, 2020, p. 4852). This interview form is especially relevant for exploration and orientation in a new field, for understanding this field, to contribute to the development of thematic structures and the generation of hypotheses (Bogner & Menz, 2009, cited after Flick, 2022). Based on the characteristics of semi-standardised expert interviews, this survey method was used in conjunction with the literature review to provide an orientation, initial findings and hypotheses on the state of institutionalised TVET research in Costa Rica, as well as to draw hypotheses on needs, challenges and future recommendations for action based on the evaluation results.

For structuring the data collection, an information sheet about the field to be surveyed and an interview guide were developed. The information sheet explains the aim, the topic of

the interview and the request for consenting information. The interview guide was organised along the following categories, which were elicited based on the literature review: Analysis of research topics; TVET structures and actors, their capacities to conduct research in this area, existence of research networks; analysis of national norms/ institutional actors of TVET policies in Costa Rica; recommendations for strengthening TVET research. The interviews lasted an average of 60 to 90 minutes and were conducted in Spanish, transcribed and then translated into English.

### 3.4 Analysis Processing

The data collection was followed by the data analysis and interpretation using the method of qualitative content analysis by Kuckartz (2018; 2019). This method comprises six steps that need to be implemented in the evaluation process. These are initiated text work, the development of thematic main categories, the first coding process, the compilation of all text passages coded with the same category, the inductive determination of subcategories in the material, and a second coding process. Overall, this analysis process involves organizing, coding, and analysing the data to derive meaningful insights and conclusions from the collected information. The categories selected cover various dimensions of TVET research in Costa Rica, including the current landscape, stakeholders, policies, research activities, gaps, and recommendations for promoting further research in the field. Below, some of the categories used and identified in the evaluation process are presented:

- Assessment of the (institutional) state of development of TVET research
- Identification of academic and non-academic institutions in TVET research
- Institutional capacities of academic and non-academic institutions in TVET research
- Existing cooperation among the institutions that are executing TVET research
- Research networks among institutions
- Relevant TVET issues currently being discussed
- Research gaps in TVET
- Future fields of actions

Based on these categories, the next chapter provides some results obtained from the expert interviews. We subsequently discuss these results and link them to the theoretical explanations from Chapter 2 with the emergence of scientific disciplines and the five stages of institutionalisation of science according to Clark (1972). This serves to classify the degree of

institutionalisation of TVET research in Costa Rica and refers to the first formulated research question that was “What is the current status of TVET research in Costa Rica, and what level of scientific institutionalisation has TVET research in Costa Rica achieved?” Furthermore, along with the obtained results, we discuss the research question on needs and challenges to further TVET research.

## **4. Results and Discussion**

### **4.1 Status of TVET Research in Costa Rica**

#### **4.1.1 Institutions, Capacities, and Fields of Research**

Based on the literature review on TVET research published between January 2000 and May 2023, the main topics that showed the most interest in research and publication are the following: VET system and dual VET. This reflects the growing interest in both topics in Costa Rica from both the academic and business sectors, especially in dual VET since 2019, with the business sector showing greater interest in applied research that allows them to learn about alternative solutions to their problems with skilled human resources at the technical level. Since 2020 to date, research on TVET in Costa Rica has increased due to the growing number of TVET researchers and the number of publications, as well as the level of academic preparation of researchers who publish. Most researchers - authors of peer-reviewed articles - are from Costa Rica and belong to Costa Rican public universities and European universities (Germany and Switzerland). In Costa Rica, there are four academic research journals that have published peer-reviewed articles on VET in recent years, although their focus is on education in general. Similarly, there is no institute or university research centre in Costa Rica that specialises exclusively in TVET.

Furthermore, considering the data collected in the interviews, we can show aspects that can be described with regard to the institutions, their capacities, and their networking in TVET research in Costa Rica.

One of the three academic institutions that are involved in TVET research is the National Technical University (UTN). UTN is making efforts to venture into TVET research and is building its capacity in this area. Additionally, UTN has established arrangements with Germany to collaborate on a research project, which suggests an active pursuit of international partnerships to enhance their research endeavours. UTN has a technical team consisting engaged in research part-time. As one interviewee explained, “In total, UTN has three people involved in TVET research”. It should be pointed out that these three people are not specifically assigned

only to TVET research but also fulfil this role alongside their other professional tasks. This includes cooperation in the CoRiVET project. It is noteworthy that UTN has allocated a budget for research, indicating a commitment to advancing their research capabilities. Indeed, another interviewee noted that UTN “is trying to venture into TVET research, given that it is building capacity”. At the same time, UTN receives the least amount of state funding compared to other national universities. This information implies that UTN may face financial constraints compared to other institutions receiving greater state funding. However, UTN has been publishing and conducting studies on, for example, TVET teacher training (Rommel & Vargas Mendez, 2022) or the TVET system in Costa Rica (Láscarez Smith & Baumann, 2020) for quite some time. In addition, UTN is one of two state universities in Costa Rica that offer education for TVET teachers and participate in the Establishment of the National System of Technical Vocational Education and Training (SINEFOTEP), which aims to promote TVET research and strengthen the TVET system in Costa Rica.

Additionally, the University of Costa Rica (UCR) has a strong track record in national and international educational research, indicating its extensive experience in this area. Moreover, the involvement of undergraduate students in research reflects UCR’s commitment to fostering a research culture and providing opportunities for students to contribute to research projects. UCR is noted for its significant human capacity, implying that it possesses a substantial pool of knowledgeable and skilled individuals who can contribute to research initiatives. One interviewee explained that “UCR has a lot of experience in national and international research”. However, the Institute for Research in Education (INIE) of UCR is engaging in TVET research for the first time. This new focus on TVET research is made possible through funding received from Switzerland, which likely plays a crucial role in enabling INIE-UCR to expand its research activities in this field. The project INIE has undertaken with Switzerland is LELAM-TVET4INCOME, which aims at analysing the link between education and the labor market and under which conditions TVET improves the income of youths (Camacho-Calvo et al., 2019). Furthermore, UCR is engaged in some national research activities such as preparing a country report on dual education, in which UCR supported the analysis and results chapter, which seeks to harmonize what the institutions say about dual education. Additionally, a book on the history of TVET is being prepared in cooperation with UTN. UCR also has an electronic journal in which TVET publications are sporadically published. Lastly, UCR receives the most state funding of any publicly funded research institution, indicating that it has a higher financial allocation compared to other public universities in Costa Rica.



In addition, the Technological University of Costa Rica (TEC) is one of two state universities that offer teacher education for TVET. TEC has capacities for research and conducts it. However, the field of TVET research remains less explored and is implemented through master's degree theses by students from the degree programs. One interviewee explained that "TEC conducts research through the theses of its Master's program, for which they have defined previous lines of research for TVET, but they do not always take the theses to publication. They have one person who is dedicated to doing research".

Furthermore, the INA in Costa Rica has a dedicated research unit called the TVET Research Center. INA receives financial resources from companies, which could potentially be utilized to support TVET research activities. This suggests that INA may have more financial resources available compared to other TVET institutions due to its partnerships with the business sector. INA invests its financial resources in applied research<sup>1</sup>, focusing on the needs of technical personnel in the business sector in order to keep its professional training offer updated in terms of content and technology. Since the Costa Rican government restricts financial resources for TVET research, one interviewee pointed out that "only ... INA has financial resources (from companies) and could finance research".

INA underscores the importance of applied research and has been actively engaged in conducting studies or projects related to applied TVET research, but this is still at an early stage of development. Indeed, an interviewee stated, "The level of technological research is very basic in Costa Rica. We should raise the level; move from bibliographic research to more applied research, which should be institutionalised and standardised. Currently, technological research is done on a voluntary basis in each technical unit of the INA". According to INA, one of the main reasons for carrying out applied research is the need to keep the technological content of its different professional training programs updated while the business sector's objective is to have qualified human talent as technicians in order to sustain the growth of companies in the future. Regarding financing for applied research, INA has its own financing, provided by the companies, which is mandated by law for professional training. Applied research has been one of INA's priorities since 2018, and, as an interviewee noted, "there was an internal reform in 2021 that expanded INA's mandate, which allowed INA to start working on jobs of the future, in both qualitative and quantitative applied research".

Unlike INA, the Costa Rican Chamber of Industry does not have its own financing for research and relies on external sources but has been conducting applied research on two main

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<sup>1</sup> In Costa Rica, applied research is called technical research.

topics since 2019: dual education and future needs of technical human talent for certain industries. According to an interviewee, “companies should dedicate a percentage to finance research. They should have access to seed capital from the government and development banks so that companies spend on research. In Costa Rica, the Ministry of Science, Innovation, Technology and Telecommunications (MICITT) has been trying to provide funding for research projects of companies, but governments change every 4 years and change the projects and mechanisms to support companies”. Moreover, another interviewee stated, “There is no tradition of technological research in Costa Rican universities; therefore, companies do not find Costa Rican universities that do this type of research. And some companies are forced to have their own research and development area. In Costa Rica, there is no installed capacity of researchers, and there is no model of technological or applied research”.

Finally, the MEP in Costa Rica is making initial efforts in TVET research. It is worth noting that the MEP has had a research structure in place for several years, indicating its recognition of the importance of research in the field of education, including TVET. For example, the business and community outreach department of the Directorate of Technical Education and Entrepreneurship conducts research on, among other things, the integration of upper-secondary vocational school graduates into the labour market. This department conducts a survey and collects data every 2 years. One interviewee explained, “The Department of Business and Community Outreach of the Directorate of Technical Education and Entrepreneurship conducts research on the labour market insertion of graduates of the vocational school at upper-secondary level, but the data is processed internally by the MEP”. However, there seems to be a lack of dissemination of this data to other actors in TVET and TVET research. So, although the MEP is one of the main political and operating actors in TVET and is involved in various TVET initiatives, its research department is mostly concerned with research for general education.

In order to visualize the individual activities and capacities of the institutions involved in TVET research more clearly, we have summarized them in Table 3. However, this representation is based on the survey carried out and therefore does not claim to be entirely comprehensive.

**Table 3**  
**Research Capacities and Fields of Institutions Involved in TVET Research**

	Institution	Capacities	Research themes and fields	Type of research
<b>Academic</b>	UTN	<ul style="list-style-type: none"> <li>Employees and university teachers who conduct research part-time</li> <li>Program on TVET teacher education</li> <li>Cooperation with Germany within the framework of CoRiVET</li> <li>Lowest state funding</li> </ul>	<ul style="list-style-type: none"> <li>National qualification framework</li> <li>Teacher education for TVET and institutionalisation of TVET research</li> <li>Dual system</li> </ul>	Basic
	UCR	<ul style="list-style-type: none"> <li>Employees and university teachers who conduct research part-time</li> <li>Student assistants in research</li> <li>Highest state funding</li> <li>High level of institutional structure for international and national research by, for example, INIE</li> <li>Electronic journal</li> </ul>	<ul style="list-style-type: none"> <li>Involved in TVET research through the project with Switzerland</li> </ul>	Basic
	TEC	<ul style="list-style-type: none"> <li>Employees who conduct research part-time</li> </ul>	<ul style="list-style-type: none"> <li>TVET research due to master study program for TVET teachers</li> </ul>	Basic
<b>Non-academic</b>	INA	<ul style="list-style-type: none"> <li>Financial resources from companies</li> <li>Broad pool of employees who conduct part-time TVET research</li> <li>TVET research center</li> </ul>	<ul style="list-style-type: none"> <li>Strong link to companies</li> <li>Involved in dual system</li> <li>Conducts research for companies and dual system</li> </ul>	Applied
	MEP	<ul style="list-style-type: none"> <li>Research structures within MEP</li> <li>Department of Business and Community Outreach conducts research</li> </ul>	<ul style="list-style-type: none"> <li>Surveys on employment linkage of TVET programs</li> <li>Labor market insertion</li> </ul>	Basic
	Chamber of Industry	<ul style="list-style-type: none"> <li>No financial funding/capacities for research</li> </ul>	<ul style="list-style-type: none"> <li>Dual system</li> <li>Digitalisation and employment</li> </ul>	Applied

**Note.** Authors' illustration, 2023.

#### **4.1.2 Networks and Collaborations in and for TVET Research**

One valuable observation is that TVET institutions in Costa Rica often function as separate entities, operating as “islands” on their own. Thus, the existence of TVET research networks is one of the essential characteristics for the institutionalisation of TVET research. However, the experts interviewed agreed that there is currently no TVET research network in Costa Rica. Moreover, there is a lack of permanent dialogue among actors involved in TVET research.

Some experts interviewed mentioned that the only existing TVET network is the Advisory and Promotion Commission (CAP-Dual); however, other experts did not consider it to yet be a network. CAP-Dual includes 11 institutions belonging to the educational sector, unions, ministries, and the private sector. Efforts such as the One-Stop Shop and Single Window areas have been established to coordinate and inform companies about dual training. CAP, which includes representatives from INA, MEP, universities, and various sectors, serves as a coordination space. The National Council of Rectors (CONARE) contributes through an observatory for the labour market insertion of university graduates. Coordination spaces such as SINEFOTEP, which is an inter-institutional coordination body, work to integrate and articulate the efforts made by public and private entities related to TVET in Costa Rica. As one interviewee noted, “a SINEFOTEP strategic plan is being developed. One of the axes of the strategic plan is research, which is being led by UTN”. Based on our interviews, we noted that INIE-UCR and UTN have some collaborations to determine research topics, but efforts towards TVET research are currently isolated, with INIE-UCR and UTN (CoRiVET) being the main contributors. INIE-UCR aims to establish a TVET research network, potentially based on SINEFOTEP.

Overall, in the area of networks, we noted that there is a lack of coordination among the individual TVET actors and that the dissemination of TVET research is not adequately present, due to a missing line of inter-institutional communication. As one interviewee put it, “there is an incipient development of TVET research because there is no entity in charge of coordinating it,” and most of the interviewed experts agreed with this explanation. They stated that there is a lack of coordination among TVET actors, including universities and the MEP. A special topic that some interviewees highlighted was the lack of dissemination and communication strategy to connect research findings with decision-makers in both Costa Rica and the TVET community. Moreover, they stated that there is no correlation or relationship among universities

and the MEP, indicating a disconnect between academic research and the needs of the TVET sector.

However, the establishment of CAP-Dual and their collaborative efforts suggest that the MEP, along with other institutions, is working towards promoting and supporting dual-training initiatives. The formation of such a commission allows for collective expertise and coordination to effectively address the needs and challenges of dual-training programs. These initiatives demonstrate a growing focus on TVET research and collaboration among institutions to enhance TVET programs in Costa Rica. By investing in research and establishing collaborative platforms, the MEP and other institutions aim to improve the quality and relevance of TVET, aligning it with the evolving needs of industries and the job market.

## 4.2 Research Needs, Challenges, and Future Fields of Action

Our interviews yielded valuable insights into the current debates surrounding TVET in Costa Rica. The topics mentioned reflect the key areas of concern, highlight the topics that stakeholders are actively discussing, and shed light on the areas of TVET in Costa Rica where research gaps currently exist. These areas include organization and governance of TVET, educational models, teacher profiles, and TVET curricula dual education.

The mention of organization, governance, and inter-institutional coordination suggests that there is ongoing discourse regarding the structure and functioning of the TVET system in Costa Rica. The need for effective coordination among different institutional actors and the role of policies in promoting inter-institutional collaboration in TVET research are key points of discussion. One interviewee expanded on this point by stating that “research is done in isolation, by each institution. Research development is incipient, but there are current research efforts. More research efforts are needed”. A special topic is TVET policy due to its relevance to strengthening TVET research in Costa Rica. One interviewee suggested that “the contents of the publications should be translated into policy papers because useful information is needed for decision-making in the public and private sectors based on empirical evidence. A discussion of the results should be encouraged with TVET decision-makers, and agreement should be reached (who funds what)”.

Furthermore, the interviews highlighted the significance of educational models and the profiles of TVET teachers. Debates in this area likely revolve around developing models that cater to diverse learner needs and ensuring that teachers possess the necessary qualifications, training, and technical didactics skills to provide high-quality TVET. Regarding teacher

qualifications, one interview said, “It is believed in Costa Rica that the requirements for teacher training are the same for both general education and TVET; however, they are very different. Teacher training for TVET should provide not only knowledge but also skills and abilities for the world of work. TVET teachers must be able to access work-based learning. Teacher training should train facilitators of learning, for example, using problem-based methodologies”. On the topic of TVET teacher training, the Center for Pedagogical Training and Educational Technology (CFPTE) of UTN is working with INIE-UCR in the context of the CoRiVET project. However, although TVET teacher training has been one of the most prevalent topics in the current debate in Costa Rica, this has not been reflected in TVET research. When reviewing the existing literature, we found only one publication about teacher qualification needs. The mention of teacher training in TVET, developing and improving the teacher profile, and aligning teacher training with the world of work suggests a research gap in this area. One issue an interviewee noted is that “teachers at the vocational school at upper-secondary level (CFP) do not have contact with industry once they start working there”. Thus, investigating different teacher profiles at various levels of education and focusing on the quality of TVET teaching can contribute to enhancing the didactic-pedagogical perspective and facilitating work-based learning. Based on an analysis of the market-linkage index, there seems to be a need to link teacher training to the world of work, due to the fact that there is a lack of technical skill among TVET teachers. As one interviewee noted, “teachers should be able to have periods of technical updating in industry. This is a result of the education and labor-market-linkage index and interviews conducted”.

There is also a need for research on aligning TVET curricula with career needs of the future and labor-market trends. Updating curricula, integrating soft skills, addressing technological advancements, and promoting entrepreneurship among TVET graduates are areas that require attention. Research on adjusting TVET education offerings to the needs of working students is also essential for accommodating diverse learner requirements. Experts we interviewed also stated that there is a need for research on collaboration between educational institutions and the business sector, involving chambers of commerce in TVET research, and enhancing coordination among institutions involved in TVET. Such steps would reflect the importance of partnerships and information-sharing.

Furthermore, the focus on dual education in the interviews indicates its prominence and the need for clarity in its implementation. Interviewees also considered strengthening dual education and understanding how it operates within companies as crucial aspects. Additionally,

the connection between dual education and the competencies required by the productive sector was a relevant topic of debate. Dual education in Costa Rica is in an initial period of implementation, starting with a dual education law enacted in 2019. The German Ministry of Education and Research (BMBF) has been supporting the implementation of dual education via the MEP and the National Institute of Apprenticeship (INA) through various advisory and technical assistance projects. Different stakeholders are actively involved, including entities from the business sector, education sector, and trade unions. Some of the experts interviewed, though, had different perspectives on the subject: “The MEP... has initiated dual education in the vocational school at upper-secondary level; however dual education is not clear to parents and teachers. Some resistance from parents can be observed, instigated by some unions”. But the companies interviewed by the MEP indicated that they were satisfied with dual education. At the same time, interviewees mentioned that an emphasis on job-prospecting studies, evaluating the labor market insertion of graduates, and assessing the long-term financial benefits of dual education for companies highlight the need for comprehensive research in understanding the present and future needs of the labor market.

Overall, the interviewees identified many needs for TVET and TVET research in the future. Ultimately, they pointed out that TVET research is important but has historically been neglected in Costa Rica, as one interviewee summarized: “I qualify it as research that historically had little importance in Costa Rica. However, in the last 10 years, there have been advances, but at the same time, it is weak because many times only diagnoses are made on professional training needs in companies”. Additionally, some research efforts have not addressed all necessary topics, or TVET research has remained very basic. One interviewee opined that “more TVET research must [be] expanded to the [macro] level and micro level” while another noted that “the research proposes descriptive, diagnostic-type research, which is very basic”. Also, the topic of defining specific research lines for TVET was seen as a challenging but necessary effort to further TVET research.

The opinions provided highlight several key points regarding the development of TVET in Costa Rica and the associated needs for research: incipient development and lack of coordination and dissemination, limited correlation between universities and the MEP, inconsistent research efforts and lack of cohesion, potential for improvement, and utilisation of untapped opportunities, and need for greater promotion of applied research.



So, what conclusions can now be drawn about future fields of action to strengthen TVET research in Costa Rica? Based on their frequency in interviewees' statements, the following actions in Figure 2 are relevant to improving TVET research and its institutionalisation.

**Figure 2**  
**Needs for Action on TVET Research**



**Note.** Authors' illustration. 2023.

The summary in Figure 2 and the individual arguments in the above discussion of the results clearly show the avenues for promoting the institutionalisation of TVET research. Thus, the funding of TVET research, networking among the actors and institutions, a defined line of research with corresponding standards for TVET and policy-making are essential needs to further the institutionalisation of TVET research in Costa Rica. Furthermore, one interviewee mentioned that the promotion of TVET teacher training should be promoted at the master's-degree level: "In Costa Rica, there is a need for a master's degree in TVET that can focus on teacher education". However, only TEC currently offers a master's-degree-level qualification for TVET teachers with the potential to pursue a PhD after graduation.

## 5. Conclusion and Outlook

Research in TVET is a pretty new scientific field in Costa Rica, which has emerged in the New Millennium. It shows an initial progress in the last 12 years due to the increase in the number of researchers and the number of publications about the TVET system and dual education, which are disseminated internationally. However, some research gaps have been

identified during the literature review and the data collection through the expert interviews, that should be considered for a research agenda in TVET for the coming years. For instance, we observed that there are inconsistent research efforts in Costa Rica and a lack of cohesion. Research is primarily conducted in isolation by individual institutions—mostly public universities—leading to fragmented efforts and a lack of sustainability. Moreover, there is no unified and clear research line or standards for institutions or actors who are engaged in TVET research. In general, the interviewees considered TVET research to be weak, with more focus on academic research than applied research but with great emphasis from INA and the Chamber of Industry on applied research in TVET. Overall, there is a need for greater inter-institutional collaboration and cohesion in TVET research. During our research, we identified some researchers with minimal institutional support who have few common values or institutional norms, even though in a public university the students may support TVET research. In Costa Rica, there is a small pool of researchers engaged in TVET research, so they know each other and have developed a certain level of professional social relationships with each other, yet they still form a relatively informal network. The research they carry out and publish remains sporadic and fragmentary, with no specific TVET journal in which TVET research is published. Based on our results, we conclude that TVET research in Costa Rica is currently in its early stages with limited coordination, dissemination, cohesion, and institutional collaboration. Therefore, the present state of institutionalisation of TVET research in Costa Rica corresponds to the second stage, amateur science, of Clark's (1972) five stages of institutionalisation of science.

The experts we interviewed concluded that it is necessary to establish a TVET policy in Costa Rica, which includes TVET research, in order to garner the corresponding infrastructure and financing. Moreover, they identified a need for an institution in Costa Rica to assume the coordination of TVET research, promote the establishment of a thematic network in TVET research, and establish lines of research. Collaborative and inter-institutional efforts can be beneficial to promote synergy and address common challenges in the field of TVET research. By fostering cooperation and partnerships among TVET institutions, researchers can share resources, expertise, and best practices. Interviewees also noted that collaborative efforts can lead to the development of standardized curricula, joint research projects, the exchange of faculty and students, and the establishment of common quality-assurance mechanisms. At the same time, the professionalisation of TVET teacher training with study programs at the master's-degree level and thus the possibility of promoting PhDs at Costa Rican universities in

the field of TVET could strengthen the promotion of young researchers in TVET as well as related research institutionalisation efforts.

Public universities involved in TVET research are facing a resource crisis with budgetary restrictions limiting their capabilities. Despite these challenges, they are still actively conducting TVET research but with limited resources and dissemination possibilities. This situation highlights the importance of recognizing and addressing the resource constraints faced by public universities engaged in TVET research. Adequate funding and support are necessary to sustain and expand their research efforts in this field. Some measures to strengthen TVET research include the realization of an annual forum of TVET research that serves as a meeting between academic researchers and technological researchers (applied research), the elaboration of an annual or biannual report of TVET in Costa Rica, the creation of a TVET repository that includes the publications made on TVET (basic and applied research), the professionalisation of TVET teacher education at the master's-degree level, and the promotion of potential PhDs in TVET.

In conclusion, TVET research in Costa Rica is in its infancy but has great potential for growth. Thanks to the committed actors in TVET and TVET research, there are far-reaching opportunities to further institutionalise TVET research and establish a corresponding network with the possibility of continuing the exchange of research results, aims, and resources. Finally, we note that this paper aims to provide an overview of the current state of TVET research in Costa Rica and not to assess research efforts made by Costa Rican colleges. After all, TVET research is still in the process of institutionalisation, not only in Costa Rica but also in other countries such as Germany. Therefore, we bear in mind the limitations of this explorative study, which does not aim to be comprehensive, but rather to provide an insight into the landscape and the path of institutionalisation of TVET research in Costa Rica.

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