TVET Research in SSA: Recommendations for Thematic Priorities

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Abstract

This paper builds on our study on research on Technical and Vocational Education and Training (TVET) in sub-Saharan Africa (SSA). The study was commissioned by the German Federal Ministry of Education and Research (Bundesministerium für Bildung und Forschung, BMBF) and was conducted in 2019. Our study undertook a systematic literature review, which evaluated over 2,000 scientific publications, classifying some 300 as relevant to the topic and examined them in greater detail. One focus area was the institutionalisation of research on TVET in sub-Saharan Africa, its actors, networks and funding. A second area focused on the topics and content addressed by researchers on TVET in SSA. Our comprehensive study allows us to derive indications for future TVET research in SSA, which form the content of the present paper. Our recommendations for future research emerge from: The research literature analysed; A series of expert interviews; and A Structured Community Review. Our key contribution is an extension of the Mulder-Roelofs Vocational Education and Training Research Framework of categories for TVET research. The framework reflects the focus and quality criteria of European/German TVET, and is an ideal starting point. Through our research, we revised and extended the framework for use in SSA. Our goal was to build on international standards on the one hand, but on the other hand to extend and apply those for use in SSA. It therefore makes it possible to respond to the latest state of research both from a European perspective (e.g., donors/organisations like BMBF), as well as to examine the broad spectrum of very different aspects of TVET research in SSA. After presenting the relevant categories of TVET research, the authors go into detail on the topics for further research. Their conclusion recommends continuous research monitoring based on a constantly updated international network of researchers and institutions with an interest in TVET research in SSA. In particular, we propose a coordinated effort for an online, international community of stakeholders and researchers involved in TVET research in sub-Saharan Africa (https://convet.org).

Key words: *TVET, Research, Teacher, Education, Workbased, Internationalisation*

Introduction

This paper builds on an earlier study (Haßler et al., 2020) focused on the state of research on Technical and Vocational Education and Training (TVET) in sub-Saharan Africa (SSA). The study (Haßler et al., 2020, hereafter TVET-R-SSA) was commissioned by the German Federal Ministry of Education and Research (Bundesministerium für Bildung und Forschung; BMBF) and conducted in 2019–20. A systematic literature review was undertaken to evaluate over 2,000 scientific publications for the study, classifying some

300 of them as relevant to our investigation. One focus was on the institutionalization of research on TVET in sub-Saharan Africa, its actors, networks, and funding. As a secondary focus, the authors analyzed the topics and content addressed by researchers on TVET in sub-Saharan Africa. The full report with an appendix containing a bibliography of some 50 pages is freely available under a Creative Commons licence (TVET-R-SSA).

The report allowed us to draw conclusions for future TVET research in SSA. Such recommendations for further research emerge from TVET-R-SSA by drawing on the research literature analyzed, the series of interviews conducted, and the Structured Community Review. Our earlier recommendations (TVET-R-SSA) echo the recommendations of other researches, namely (1) to undertake further evaluations (cf. Ethiopia: Belwal, Dawit & Medhanie, 2010), (2) to undertake follow-up research building on earlier results (cf. Ghana: David & Asamoah, 2011; Uganda: Tukamushaba
& Xiao, 2012), and (3) to undertake replication studies (cf. Kenya: Mayaka & King, 2002, Cameroon: Lange & Benavot, 2016).

However, while TVET-R-SSA made a range of such recommendations for further research, it provided neither a systematic catalogue of research topics that should be examined nor a systematic catalogue for SSA. Because of this, it is difficult to undertake systematic TVET research in SSA, which could focus on drawing broader conclusions to fill existing gaps. We therefore ask: how can the specific recommendations (TVET-R-SSA) be placed into a framework to obtain more comprehensive insights and transferability?

While there is no such framework for TVET research in SSA, there is a global framework of categories for TVET research developed by Mulder & Roelofs (2012). The Mulder/Roelofs Vocational Education and Training Research Framework we used is based on earlier representations of research classification in TVET (Mulder & Roelofs,
2012; Mulder & Roelofs, 2011; Rauner & Maclean, 2008, Rauner, 2017; and McGrath et al., 2019). It is suitable for examining a comprehensive spectrum of very different aspects of global TVET research. In this paper, we examine this framework in light of TVET-R-SSA, enabling us to modify the framework as needed.

The following sections discuss various aspects of the Mulder/Roelofs framework in relation to our earlier findings. A comparison table is available separately (Haßler & Haseloff, 2021). Note that, in the text below, the word 'Section' refers to the different sections in this paper. The word 'Chapter' refers to the chapters in TVET-R-SSA.

Central Thematic Priorities

This first section focuses on the central thematic priorities emerging fromTVET-R-SSA. These priorities are: research on teaching and learning (Section 1.1), cooperation among different places of learning (Section 1.2), continuous teacher qualification and further training, as well as integration of "side entrants" and "career changers" (Section 1.3), models for integrated initial and further/in-service teacher education (Section 1.4), issues of inclusion, integration, and participation in TVET (Section 1.5), and information and communication technology (ICT) in education (Sector 1.6).

Teaching and Learning Research

According to both TVET-R-SSA and Mulder/Roelofs, questions regarding the pedagogical or educational design of teaching and learning in TVET are considered a core area of TVET research and require timely responses. Such questions should be examined holistically in an international and interdisciplinary context (such as employment and social research). They should also be examined under various aspects of TVET, such as curriculum development, and work-/demand-oriented TVET.

In the reviewed literature (TVET-R-SSA), the current state of learning and teaching in TVET is described as problematic. TVET is often based on curricula that are perceived as being inadequate and producing questionable results. Research could usefully examine the underlying theories for learning and teaching in TVET in SSA. Internationally recognised and tested models for learning and teaching in TVET should be considered for comparison. However, the aim should not be a simplistic transfer of successful concepts from Europe or Asia to SSA. Research must identify and test which international concepts can be used in various countries in SSA, considering what changes need to be made and where regional/international coordination is beneficial.

Analysis of the research literature (TVET-R-SSA) shows that the dominant paradigm in SSA is competency-based teaching and learning (Deissinger, 2013), which broadly follows the Anglo-Saxon tradition of TVET. We note that this paradigm differs from the competence-based TVET prevalent in Germany (TVET-R-SSA) as recommended by the Standing Conference of the Ministers of Education and Cultural Affairs of the Countries in the Federal Republic of Germany (Ständige Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland, KMK, 2011). Further research on understanding competency-based teaching and learning or the scientific-theoretical basis of TVET research is highly relevant to developing theoretical ideas.

Workplace-oriented TVET is required throughout SSA (TVET-R-SSA). However, implementation of this is not straightforward. Ideally, cooperation between different learning venues (college vs. work place) would take place; however, in many regions of SSA, companies or organizations that could provide training do not exist or are unwilling to provide training. Teaching and learning research should address such issues, focusing on developing flexible designs for (action-competence-oriented) TVET (cf. Section 1.4). For example, research could explore the idea of inter-company TVET centers run by several institutions. This could involve exploring pilot projects, e.g., researching the efficacy of student enterprises, advice centers for companies, etc. Such inter-company vocational training centers have emerged as a means of providing complementary centralized vocational education and training in Germany (BIBB, no date). Where a TVET institute includes a workplace structure, opportunities to offer on-the-job learning in close collaboration with the vocational institute should be used and encouraged. Research should identify feasible ways of collaborating. Several questions need to be addressed - such as questions about learning transfer from one learning location to another, access to work placements, the seeking of internships and jobs, and the conditions for workplace-based learning. Forms of support for companies that offer TVET should be considered.

Research should be carried out to compare paradigmatically different approaches on professional (pedagogical) work and learning theories, as well as on authentic assessment competence. Appropriate models should be tested collaboratively.

It may be useful to look for parallels between research in the field of general education and the field of TVET. It may be possible to use the significant volume of research in this area to develop TVET and TVET research. For example, the cultivation of a research-oriented approach among teachers and learners in both TVET and general education is an important area where commonalities could be explored. Informal learning is important and offers various opportunities. How informal learning could be effectively harnessed could be a significant research area.

The question of how ICT can enrich teaching and learning in TVET is being raised internationally and in SSA. Collaborative research on this topic could focus on using existing equipment as educational tools, on working with computer-supported collaborative learning platforms in TVET, and on the possibilities of better integrating ICT into existing approaches to teaching and learning. An urgent priority would be to research effective models broadly classified as "blended learning" models to determine new ways for the meaningful use of ICT in TVET and how it could be developed and tested in collaborative research; given the current interest in blended learning for primary and secondary teachers due to COVID-19, this is another area where there could be significant synergies.

Effective teaching needs to include assessing and examining learning outcomes. We recommend this as an important research focus. Further developments in TVET need to be driven by assessing the effectiveness of current TVET; continuous monitoring of TVET programmes must be undertaken. The measurement of competencies (of teachers and learners) in TVET according to well-founded evaluation criteria and models may well be possible online and has already been tested by several researchers (Rauner et al., 2011). The results offer opportunities for cross-regional comparisons of teaching and learning competencies (Rauner et al., 2013).

Places of Learning and Networking

As noted above, research from SSA indicates that the importance of learning in the workplace is clearly recognised by researchers. Mulder/Roelofs also classify this aspect as important for TVET research more broadly. For example, collaboration between different places of learning is fundamental to the success of German TVET. Since 1996, the curricula for job-related teaching in German TVET have been structured according to
'learning fields'. Such competence-oriented formulated 'learning fields' make learning explicit in the context of professional activities. The fields are based on specific professional tasks and professional activities, as well as individual and social tasks. In
'learning field-oriented education', tasks from company-based work are linked with theoretical reflections on these work processes. Depending on the previous experience of the learner, such reflections are at different levels of complexity (KMK, 2011). Networking, and especially work-process orientation in TVET, must also be further examined with a view to meeting quality standards in international TVET collaboration. Research in this area affects industry demand for well-educated skilled workers.

This applies equally to the orientation of initial and further education programmes. In particular, the authors recommend taking a closer look at, and following up on, initiatives such as the African Union Development Agency (NEPAD), the Pan-African Network University (PAU) in Ethiopia, and the TVET Authority Kenya (Network) in Kenya. The latter has already made it possible to network with various research institutions and companies for cooperation in these countries.

We highly recommend researching the conditions (barriers and enablers) needed for successful networking; this is particularly relevant since SSA cannot simply fall back on an established dual system. Collaboration between different places of learning needs to be developed, enabling workplace learning or access to internships. Precisely how this can be brought about needs to be urgently researched. In SSA, questions of learning-place networking also concern the interaction of formal and informal TVET, a relatively new research topic that is increasingly coming to the fore in relation to SSA.

Continuous Teacher Qualification and Training, and Attracting New Target Groups as TVET Teachers

This research focus concerns questions of in-service training for TVET teaching staff, whether such in-service training leads to further formal qualifications or not. Research also needs to focus on how to attract new target groups as teachers in TVET institutions. Such groups include, for instance, professionals with relevant study and work backgrounds who offer relevant experiences for teaching TVET. Some such groups may already be working as TVET teachers while attempting to obtain further qualifications to solidify their status. An important research question is how competences can be developed, evaluated, and recognized.

The need for ongoing professional development was evident from TVET-R-SSA (both literature and interviews). The literature review (TVET-R-SSA) showed that in SSA, teacher-centred, lecture-based, and barely interactive approaches predominate in teacher training. However, references to interactive learning were frequently found in the literature reviewed as well as a determination to encourage these concepts (cf. TVET-R-SSA, Chapter 8). The interviewees pointed out the need for development in terms of deepening technical, professional, and sound pedagogical knowledge for TVET teachers. Research on methods for further TVET teacher training, the development of appropriate qualifications, and good practical TVET teaching skills are mentioned as prominent TVET research topics in SSA (TVET-R-SSA, interviews: Cameroon, Ghana, Ethiopia, Nigeria, South Africa). In particular, TVET teachers need to be enabled to respond to the ever-changing demands being made on the workforce (interviews: Ethiopia, Kenya).

Having qualified TVET personnel with internationally recognized teaching skills is a prerequisite for the success of international collaboration in TVET. For this reason (and based on the above-mentioned data), we urgently recommend fostering the continuous qualifications for teachers (TVET-R-SSA). In this respect, German and European TVET research can point towards models that have already been developed and offer a wealth of expertise.

To counteract a shortage of professionally qualified TVET teachers, attempts are also being made in SSA to integrate experienced professionals from the world of work into teacher training in TVET. This requires providing them with appropriate, additional, educational training. Research in this area, e.g., as described by Ahmed (2011), Chiksanda, (2011), Haseloff (2017); and Papier et al. (2017), is also recommended by Mulder/Roelofs. This should also be pursued and encouraged because of partially similar problems encountered outside SSA.

Model for the Integrated Education and Training of Teachers

It should be possible to offer (future) TVET teachers in SSA training (i.e., training programmes) that support not only their personal career planning, but also the development of the TVET institutions. Therefore, in addition to research on technical and well-founded pedagogical knowledge and teaching skills, research is also required on topics relating to the structuring of training programmes, the establishment of learning venues, and laboratories and curriculum development.

For example, the VET-Net project developed an integrated and highly flexible education and training model with African partners (Haseloff, 2017). It allows heterogeneous groups (e.g., engineers and experienced professionals) to access teacher training. By integrating teaching and learning modules, which correspond to the students' competences (novice to expert), it is possible to progress from a bridging course to entry level to a Bachelor or Master of Education (Haseloff, 2017). Following the comprehensive approach to education and training offered by this model, TVET teachers acquire competences to design teaching models and curricula and to appropriately utilize learning locations.

Such models are also relevant to the topic of 'career changers' in educational institutions such as TVET colleges. Research on the permeability of educational pathways is recommended. Such research is relevant to developing opportunities for SSA, but a continuing TVET model that is jointly tested and implemented can also be effective outside of SSA (e.g., Europe, including Germany, where there are similar issues).

Inclusion, Integration, Participation in TVET

Research on TVET and social justice emerges as a clear field of research. Particular attention should be paid to questions of equity for all people benefitting from TVET opportunities (inclusion-related circumstances and other challenges). Countries in SSA should be supported and encouraged to provide targeted support for disadvantaged and vulnerable groups in TVET (considering regional variations). This may involve very concrete measures in TVET institutions; implementation should also be monitored and evaluated.

TVET-R-SSA (Chapter 9) lists reasons for people being disadvantaged in access to TVET because of a range of factors. Such factors include economic status, geographical location, age, ethnic origin, religion, gender, and sexual orientation. Refugees are also among the disadvantaged. TVET can be a way for refugees to be integrated into new communities. Young people - even those with TVET qualifications - are disadvantaged on the job market compared to older people. This is mainly due to young people's training lacking practical relevance and their insufficient experience in the workplace (TVET-R-SSA, Chapter 9). In the interviews, the issue of "access to and equity in TVET"

was mentioned as a new research topic (Zambia, Malawi, Nigeria). Like Mulder/Roelofs, we consider TVET programmes for immigrants as an important new research area.

We note that the publications (considered in TVET-R-SSA) tend to suggest the need to facilitate access to TVET for minority groups, stating that governments and public authorities should be encouraged to support this facilitation. However, integration, equal opportunities, and gender aspects are rarely discussed or indeed addressed in detail. Specific proposals on how changes could actually be implemented or have already been implemented are — as the literature review shows — rare and often not very valid in the research literature (TVET-R-SSA, Chapter 9).

Some examples of the effectiveness of government policy regarding inclusion-related goals are available (TVET-R-SSA, Chapter 13). For example, one of the few studies available (in South Africa) states that there is still considerable segmentation by ethnicity and gender within the TVET sector. While policymakers are calling for positive changes, there is little monitoring or support for the development and implementation of measures to help achieve them. Therefore, we recommend that questions of gender equality for all people should be included in future research and that targeted support for vulnerable groups should be developed. Examples of further research are Butler & Ferrier (2000) and Gaidzanwa (2008). An important and extendable finding is made by Pongo and colleagues, who examine how TVET can contribute to the equitable development of society, including national and regional strengthening and development (Pongo, Effah & Osei-Owusu, 2014, Papier et al., 2017).

Another critical line of research is the investigation of dropping out from - or failing in - TVET programmes. Access to training places and programmes is particularly important in SSA. Since employment opportunities are significantly higher for people who have completed their training than for untrained persons, prioritising research on dopping out and failing is an important step towards curbing youth unemployment and its consequences.

Information and Communication Technology in Education (EdTech)

Information and communication technology (ICT) in education - for short, EdTech - is an important area for TVET. A clear interest in the use of EdTech for teaching and learning within TVET programmes in SSA was evident (TVET-R-SSA, Chapter 8). The interviewees were interested in learning opportunities about the potential of EdTech in making better use of the existing equipment as a teaching tool, and in integrating EdTech into TVET teaching and learning. Some interviewees voiced the need for support in implementing and maintaining TVET data management systems or learner management systems (interviews: Kenya, Madagascar, Namibia; Structured Community Review).

Importantly, existing research on TVET indicates a lack of evidence on the impact of ICT on the efficiency of TVET programmes (Zambia, Namibia, Botswana, South Africa: Hoosen & Butcher, 2017). Actual research results on the meaningful use of even simple EdTech, such as the use of video material (Ghana: David & Asamoah, 2011), are rare. Overall, we recommend research on working with computer-supported collaborative learning platforms in TVET, on the use of EdTech and multimedia, on practice-oriented computer simulations, as well as on competition and games that simulate societal processes.

Our analysis shows strong infrastructural limitations affecting the ICT sector in SSA (significantly different to, e.g., Europe). Therefore, SSA should — on a larger scale - initially focus on the use of basic technologies to support teaching and learning (laptops, tablets, digital resources). TVET research must integrate this research into existing teaching and learning concepts and develop viable models for different approaches in the broad spectrum of 'blended learning'.

Concerns over the effective use of EdTech with TVET students and TVET teachers mirror concerns over the use of EdTech with students and teachers in general education. We recommend reviewing publications of the EdTech Hub in the EdTech Hub evidence library, focusing on (1) using technology to support the professional development of primary/secondary school teachers and school leaders (Haßler, 2020; Allier-Gagneur et al., 2020; McBurnie et al., 2021; Adam et al., 2021; McBurnie & Plaut, 2021; El-Serafy et al., 2021), (2) effective approaches to curriculum development and learning assessments for schools (McBurnie, 2020; Chandra, 2020; Adam et al., 2021; Clark-Wilson, Bashir & Kaye, 2021), (3) developing robust education data systems for general education (Adam et al., 2020; McBurnie, 2021; McBurnie & Beoku-Betts, 2021), and (4) strengthening systems for monitoring, evaluation, research, and learning in general education (Kaye, Groeneveld & Bashir, 2020; Khalayleh et al., 2021; Singal et al., 2021).

Specific Topics for TVET Research in SSA

This section presents specific topics for TVET research in SSA. These topics subordinate to the central thematic priorities presented in Section 1 above. This does not mean, however, that they are unimportant or should not be researched. The specific topics presented deal with TVET and society, the TVET system, guidelines, organization, and management, teacher education and the role of teachers in TVET, and the curriculum for TVET.

TVET and Society

Our analysis (TVET-R-SSA) allows us to derive sub-themes from the meta-theme 'TVET and society', such as TVET and social justice, national recognition of TVET, and entrepreneurship and private-public-partnership. These issues also address quality criteria regarding collaboration between government and industry, the establishment and maintenance of training standards, and the institutionalization of research. Our analysis (TVET-R-SSA) showed the dependence of (quality in) TVET and TVET research on the provision of material and human resources.

National recognition of TVET. Many countries in SSA are simultaneously affected by high unemployment as well as a shortage of skilled workers (and the resulting consequences). Research should, therefore, develop approaches to strengthen the status of TVET. Lolwana and Oketch (2017) write that companies face problems of insufficient numbers of trainees and - ultimately - skilled workers; there is, at the same time, a great demand for academic training alongside high youth unemployment. Policies typically do not address such problems with the necessary attention and support.

Stigmatization of TVET is cited as a problem by various researchers (cf. TVET-R-SSA; Oketch, Mutisya & Sagwe, 2012). Several factors, such as the cultural-historical development and national recognition of TVET, are also responsible in SSA as factors for the role and acceptance of TVET (cf. Mulder/Roelofs categorization). The majority of the interviewees stated that TVET is perceived as a second-choice educational path in their regions (cf. TVET-R-SSA, Chapter 7). Stigmatization leads young people to reject TVET, which is linked to the "missing middle"; Lolwana and Oketch (2017) address this problem through recourse to interdisciplinary working groups, which can consider numerous factors responsible for stigmatization.

Models and practical approaches increase the attractiveness of TVET and strengthen the region's economy are sought both in SSA and worldwide — albeit somewhat differently in each case. An 'upgrading' of TVET in terms of content and concept by changing structures (involving companies, social partners, etc.) and teaching and learning conditions (tested in pilot projects) should be accompanied by corresponding publications, marketing, and communication measures. In addition, measures should be taken to ensure a high degree of permeability of educational pathways and thus avoiding the perception of TVET as a 'dead end', for example by offering a flexible initial and continuing training model (cf. Section 2.1 above).

The issue of valuing and recognizing TVET raises important questions about the transition from general education to TVET and to the world of work (cf. Kyobe, 2017). This is particularly relevant because TVET in SSA often constitutes an ineffective college-based education. Research projects that develop flexible training models on a pilot basis could examine and generate an international discussion of the conditions for the success of comprehensive and integrated TVET provision.

Entrepreneurship and private public partnership. Stimulating entrepreneurship in TVET was a frequent research topic (cf. TVET-R-SSA, Chapter 4), a subject which has moved to the forefront in recent years (interviews: Kenya, South Africa). The development of entrepreneurship has generally been viewed as an important and positive factor in TVET (cf. TVET-R-SSA, Chapter 4; interviews: Kenya, South Africa). The intensive promotion of entrepreneurial thinking and action appears to be rooted in the assumption that TVET graduates are able to create their own jobs as entrepreneurs (TVET-R-SSA, Chapter 4). While this appears as a simple solution to the lack of jobs, there is no evidence that this strategy is likely to succeed.

Research on private-public partnerships could focus on some unique features specific to SSA. TVET research should explore non-governmental activities in TVET. Collaboration between governmental and non-governmental TVET institutions should be researched and strengthened in a way that is beneficial to all those involved in TVET. Possible roles of other non-governmental institutions (e.g., trade unions) should be explored for this purpose (cf. TVET-R-SSA, Chapter 11).

Furthermore, solutions need to be created to enable companies involved in TVET to gain competitive advantages (TVET-R-SSA). TVET should be economically attractive for companies and industry sectors rather than burdensome. Research should contribute to finding (regionally) suitable incentives for such companies (cf. TVET-R-SSA, Chapter11). Interviewees reported that collaboration in initial and continuing TVET is weak and episodic (interviews: Ethiopia, Ghana, South Africa). Nevertheless, there are some enterprises that are involved in the development of TVET curricula, primarily in an effort to incorporate their requirements in terms of TVET (interviews: Cameroon, Namibia, Zambia). Public-private partnerships in TVET have so far been initiated mainly by the public sector to enable learners to take up work placements (interviews: Cameroon, Kenya, Madagascar, Namibia, Tanzania). TVET networks could involve private companies and put collaboration on a new, mutually beneficial footing.

Greening TVET. The area of 'greening TVET' has been raised in the interviews, usually in connection with UNESCO-UNEVOC activities where 'greening TVET' is a high priority (TVET for climate action) aiming to mainstream climate response in TVET. To achieve this, UNEVOC will support TVET institutions in the development and implementation of green strategies to transform their learning and

training environments. This fulfils UNEVOC's goals of skilling learners, upskilling professionals in green job sectors, and re-skilling those affected by job losses due to the green transition and the recent COVID-19 pandemic (see also UNESCO-UNEVOC, 2017). TVET providers have to develop a whole range of offers in order to meet demand (Mertineit, 2013), which would merit research. Several interviewees saw 'greening TVET' as a new research topic indicating the increasing importance of ecological issues in TVET research (interviews: Malawi, Nigeria, South Africa).

TVET System, Guidelines, Organization, and Management

Our results (TVET-R-SSA) suggest that the meta-research topic TVET system, guidelines, organization, and management should include the following areas: permeable educational pathways, state regulation (i.e., coordinated action by all organizations involved in TVET, development and reorganization of TVET institutions; clarification of the effectiveness of government policy, TVET standards and their implementation, the role of international TVET providers and the role of TVET research . Below, we will also make reference to the quality standards of the German dual system of TVET, particularly regarding the connection between TVET and society, the acceptance of national standards, and the collaboration between government and industry.

Permeable educational pathways. Permeable education pathways are needed, including both pathways into TVET as well as pathways from TVET to higher education ('upstreaming'). This is a much-discussed issue and an important starting point for discussing issues of social development. In SSA, these issues can be embedded in a broader research topic examining access to primary school, the transition from primary to secondary school, and the transition from secondary school to further and higher education — including TVET — and finally to the world of work. Several authors call for a high degree of permeability in the education system for economic and social reasons (Maclean & Wilson, 2009; Oketch, 2007; Lolwana & Oketch, 2017; Oketch, 2017). While TVET systems and national educational standards in some countries now allow TVET graduates to study up to the doctoral level, the permeability of educational pathways in SSA remains a challenge (interviews: Kenya, South Africa). National educational standards would provide a reliable framework for questions regarding the recognition of educational qualifications (TVET-R-SSA, Chapter 12).

Given the similar problems with the permeability of educational pathways in parts of Europe, an area of research on the permeability of educational pathways, and thus of in-depth educational standards, should be expanded internationally.

Development and transformation of TVET. The development of educational concepts (teaching and learning) and better personnel management are two different, but equally important, perquisites for the further development of TVET. This further development is necessary in SSA and is recognized as a governmental responsibility (TVET-R-SSA, Chapter 2). Research needs to explore the development and transformation of TVET. It also needs to explore the contexts in which TVET systems can be improved and how TVET — and TVET institutions — can be restructured as required.

The role of private and informal institutions in the TVET system in SSA and their role in overcoming the shortage of skilled labour is a key research topic that should also be addressed, including questions of social justice. Our report (TVET-R-SSA, Chapter 11) notes that data on private TVET providers was difficult to obtain and not always coherent. There was no research on the role of industry as a promoter and beneficiary of TVET. TVET research can help to provide a better overview of non-governmental TVET activities in SSA. Initial efforts to promote collaboration between governmental and non-governmental TVET institutions could be developed further, to the benefit of all involved in TVET

Clarification of the effectiveness of government policies. There is little research available on the role of TVET in formulating policy. However, opportunities and requirements for state-industry collaboration in TVET are acknowledged (public-private partnership); to a lesser extent, collaboration with other types of organizations (e.g., trade unions) is also acknowledged (TVET-R-SSA). However, in SSA, the requirements for this are very specific to national contexts. Organizational roles could be further explored with appropriate research funding. This would enable the identification of conditions under which joint projects could be initiated by state and private TVET institutions and providers, focusing on social, economic, and ecological aspects.

We note that there is no evidence of the influence of research findings on TVET policy and the actions of key players — neither at the national nor the regional level (cf. TVET-R-SSA, Chapter 11). Both the literature and interviews confirmed this. Interviewees stated that evidence-based guidelines are urgently needed to ensure the adequate implementation of TVET policy. It is necessary that research reviews the implementation, monitoring, and evaluation of TVET measures initiated by governments. This underscores the call for further research aimed at the successful implementation of TVET guidelines (Interviews: South Africa). We note that the there are several fields, including EdTech and teacher professional development for general education, where the gulf between evidence and policy is particularly severe (Haßler, 2021a).

TVET standards and their implementation. National governments in SSA typically have agencies that are responsible for the accreditation of TVET programmes and institutions. However, reliable TVET standards and their implementation — or compliance with them - are either virtually non-existent or difficult to verify (TVET-R-SSA, Chapter 12). The specifics of setting up a system for monitoring and assessing quality standards (targeting various areas) within TVET institutions are not always clear (TVET-R-SSA, Chapter 12). Interviewees raised the need for the provision of a qualifications' framework for TVET that could be replicated in different countries where appropriate (TVET-R-SSA, Chapter 7, interviews: Kenya, Uganda). According to our analysis, one goal of TVET research should be to develop and establish verifiable standards for training in occupations for apprentices and learning facilitators. We recommend the development of evidence-based criteria through which TVET standards can be developed, implemented, and tested; this would need to take place in discussion with all the partners in the TVET sector (universities, colleges, schools, administrations, social partners) and managed by a coordinating body. Evaluation criteria should be developed and implemented for this purpose, leading to the development of a replicable qualification framework for TVET.

The role of international TVET promoters and agencies. International TVET sponsors are actively involved in the development of national TVET systems and in the creation of cross-national approaches. The interviewees mentioned several international organizations (e.g., UNEVOC, GIZ, World Bank) and TVET projects funded by them (TVET-R-SSA, interviews: Ghana, Kenya, Namibia). Most of the mentioned organizations are cross-national in scope. Project examples include: continuing professional development for teachers, competence development for teachers, strategies to solve local problems, an advocacy strategy for the regional TVET sector, and guidelines for TVET policy.

To date, there has been little, and by no means systematic, research on the role of international (governmental and non-governmental) cooperation and its influence on national and regional developments in low- and middle-income countries (TVET-R-SSA). Similarly, the role of global TVET actors in the development of national TVET systems needs to be considered. For example, global actors located in Germany include the BMZ and BMZ-funded TVET projects, as well as their implementers (national governments, NGOs, GIZ, etc.). This is relevant not only for TVET but also for international cooperation as such. King (2010) offers an interesting analysis on TVET collaboration between China and Kenya; he recommended further research on approaches to international TVET collaboration including possibilities for coordinated action and cross-national approaches together with African partners.

The role of TVET research. There is a need for research about TVET research, i.e., a kind of meta-research. Such research could be undertaken by TVET researchers themselves (as reflexive research) or by other researchers. Such research should examine the role of TVET research, how such research can be coordinated, and how TVET research findings are implemented by various actors (TVET-R-SSA).

Interviewees consider the coordination of TVET research in low-income countries and the creation of cross-national approaches to be helpful (TVET-R-SSA). Interviewees from Kenya and Uganda agreed that jointly conducted research leads to better results and raises the level of TVET research in SSA. They described training courses on the coordination of TVET processes, but they reported that such courses are not usually accompanied by researchers with expertise in TVET research.

Unfortunately, TVET research in SSA struggles in terms of quality (TVET-R-SSA). Only a small proportion of the publications examined meet certain basic quality standards (TVET-R-SSA). However, this state of affair is well recognized, and there are frequent calls for developing and improving the level of research (TVET-R-SSA). Nevertheless, the literature we examined did not discuss how research standards could be raised.

A possible approach could be long-term international research programmes in which academic standards for research design and evaluation are developed, introduced, and implemented (jointly with a range of partners) in a contemporary and internationally compatible manner. To maintain up-to-date research, such programmes need to be either regional or international in scope. Such activities must also encourage continuous engagement with relevant research (e.g., through online forums, conferences, publications, etc.).

For research to be fruitful, it must respond to the needs of the region, future trainees, and industry, taking into account global developments. Only then can research become an important regional promoter of innovation (van Halsema, 2017). Decisions on what and how research is conducted on TVET in different contexts has significant political, economic, and social implications. The desire to respond to complex regional and global issues calls for an interdisciplinary approach to TVET research (cf. TVET-R-SSA). Thus, for example, reflection on meaningful prospects for TVET and its graduates needs to look at employment and job market developments, as well as the future-oriented competencies required.

Because TVET research capacities in SSA are significantly limited, research must also consider how TVET research capacities can be developed. As a first step,

incentives for research must be created in the corresponding TVET systems, which would support capacity building systematically and sustainably. Our analysis suggests that even small incentives, such as covering the logistical costs of research, can make an important contribution (TVET-R-SSA). Efforts to improve research funding from African agencies are rare. Where they exist (TVET Authority Kenya), they should be supported as a matter of urgency. Further recommendations, such as the suggestion of coordinated networking, have been made (TVET-R-SSA, Chapter 16).

Teacher Education and the Role of Teachers in TVET

This research topic is related to the quality criteria of qualified TVET personnel. While research literature is by and large available on TVET teacher education (TVET-R-SSA), there is only a very limited amount of research literature on the precise roles of teachers - and indeed, learners - in TVET in SSA. The research literature reviewed focuses on the promotion of teacher training, competence development, and changes in the numbers of TVET staff employed (TVET-R-SSA).

Beyond SSA, consideration of the role of TVET teachers is an important and central topic in TVET research; the role of the TVET teacher is closely related to the overall TVET paradigm pursued. If a competence-oriented TVET approach is followed, learner-centred education follows, and TVET teachers need to be adequately prepared for their roles. Questions regarding the training of teachers are discussed in a large number of research publications (TVET-R-SSA). The question of the pathways and content of training plays a role here. The authors recommend further research to discuss these issues and to develop and test flexible training models.

Our study (TVET-R-SSA) found that questions concerning teacher education and teacher action in general education (in SSA) are comparatively better researched than TVET teacher education (Haßler, Hennessy & Hofmann, 2018); however, even in the area of general teacher education in SSA, there is still a great need for further research (Allier-Gagneur et al., 2020). It is particularly useful to draw some parallels between teacher training for primary/secondary education in SSA and for TVET. Parallel approaches in research (for example in action and design orientation) can be found in professional (educational) work and learning theories (and in the development of authentic assessment competence). Likewise, the acquisition of a research-oriented attitude among teachers and learners in TVET and general education is a major field of development.

Curriculum for TVET

Research on curriculum development for TVET is a central area for TVET research in SSA. Under the meta-theme curriculum for TVET, and - based on TVET-R-SSA - we suggest further research in the following areas: adaptation to relevant and current competence frameworks, a focus on future-oriented competence (Section 2.4.2), hybridization and cross-border approaches in TVET programmes, and TVET programmes with a focus on enterprise. We note that these focal points are also reflected in the quality criteria for German dual training, particularly regarding learning and teaching in TVET, assessment and testing of learning outcomes in TVET, and learning in the workplace.

Adaptation to relevant and current competence frameworks. In the interviews, the design and development of curricula as well as the National Qualifications Framework (NQF), and particularly the development and transfer of competencies, were frequently mentioned as research topics (TVET-R-SSA). Most respondents consider the NQF to be necessary to offer development opportunities at the highest educational level (to graduates of initial TVET). Actual requirements and conditions in companies should inform the curriculum. For this very reason, the identification of industry needs is seen as a decisive factor for the successful provision of TVET (TVET-R-SSA, interviews: Ethiopia).

Relevant and current competence frameworks are essential. In particular, the harmonisation of supply and demand, i.e., the understanding of the importance of TVET specialisations that are in-demand, should be given a great deal of attention alongside research on the opportunities and requirements of TVET. Matching TVET programmes with demand needs to receive urgent attention within research and by policy-makers.

Concentration on future-oriented competence. There is a clear need for research to facilitate competence development in the field of ICT via TVET (TVET-R-SSA). This is often a stated goal of TVET policy. In many countries, including SSA, employees need to develop new skills that correspond to new fields of work such as ICT and robotics. This also includes sectors that want to supply a global market with digital services. This requires a globally acceptable professional competence, as well as intercultural awareness and understanding.

Interviewees expressed concern that many TVET institutions do not adopt a global perspective when designing TVET programmes (TVET-R-SSA, interviews: Cameroon, Malawi). They recommend that research projects take global guidelines, local needs, and existing best practices into account. Educators should be supported in this respect when designing a curriculum. Curriculum developers should question the relevance of TVET

curricula for the economy. This was cited by many interviewees as an increasingly important research topic, as the interviewees believe that TVET has the potential to accelerate economic development processes (interviews: Cameroon, Malawi).

Hybridization and crossing borders in TVET programmes. Research on hybridization and on cross-border issues in TVET programmes was advocated by several researchers. Attempts to further modularize and make TVET curricula more flexible in terms of time and place are seen as equally important (Eicker et al., 2017). As noted above, a clear research needs to be on work-related learning and the promotion of independence, self-employment, and personal responsibility for learners. Special attention needs to be paid to the promotion of the self-reflexivity of (future) teachers (Naeve-Stoß, 2017).

TVET Programmes for entrepreneurship. TVET programmes for entrepreneurship that promote the recognition and realization of opportunities is a research topic in the existing literature (TVET-R-SSA). However, in our analysis it is important that entrepreneurial action is not only geared to local opportunities but also considers the regional and global market (e.g., global digital services, Interviews: South Africa). The literature reviewed suggests that TVET institutions should network with companies and research institutes in order to train competent, skilled workers. It is less clear how this networking can be made effective and sustainable - there is an urgent need for research here (cf. Ezekoye, 2017; Eichhorst et al., 2012).

TVET Research in Foreign Research Policy

International TVET collaboration and support should be considered in a global context and include opportunities for coordinated action and cross-national approaches. TVET research as such should pursue cross-national approaches and be continuously supported and coordinated.

In order for international collaborations to be possible and successful, systematic (comparative) studies of TVET systems and the issues associated with them must be undertaken. Which academic paradigms are being followed? Which models pursue a more-or-less dual approach? Is a work process, subject, or academic orientation predominant? These questions must be considered with a view to a consideration of their impact at all levels of TVET. We did not find any research work in the literature that included systemic approaches to TVET or a more detailed examination of how such approaches are handled.

In the research literature reviewed, it became clear that Ghana, Nigeria, Tanzania, and Uganda have established government agencies to manage TVET and have developed TVET standards, quality frameworks, and programmes. These initiatives are a starting point. But provision should be made for joint and robust

evaluations of these developments and for further research into the effectiveness of interventions at all levels of TVET. In particular, the effectiveness of TVET policy needs to be investigated. Often, although certain objectives are recognised as important, they are not achievable by the relevant authorities and institutions.

Conclusion

The study of TVET research in SSA contributes to its development and improvement, consequently developing TVET further, and ultimately leading to achieving associated development outcomes. The method of literature research, even considering grey literature and internet resources, only allowed a partial insight into the whole research process. Therefore, some primary research is necessary. It was therefore important to undertake interviews as well as undertake a community review of the evidence (Haßler, 2021a).

The results in this paper can provide a basis for future TVET research; however, they only form a starting point that needs to be continuously reflected upon and expanded through appropriate local insights. The original report (TVET-R-SSA) is openly licensed. The bibliography therein is available digitally to facilitate further research (https://docs.opendeved.net). The report and the report bibliography enable researchers seeking to explore new areas to build on the current state of research. Through the community engagement and collaboration towards TVET-R-SSA, the foundations for a network on TVET research in SSA were laid. A WhatsApp group (originally set up for the development of TVET-R-SSA) continues to be available for discussions of future research projects.

Recommendations

The report makes a number of recommendations (TVET-R-SSA, Chapter 16). We recommend long-term international research programmes in which academic standards for research design and evaluation are developed, introduced, and implemented (jointly with a range of partners) in a contemporary and internationally compatible manner. To maintain up-to-date research, such programmes need to be either regional or international in scope. Such activities must also encourage continuous engagement with relevant research (e.g., through online forums, conferences, publications, etc.).

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