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CHAPTER 14

Circular Entrepreneurship in Northern Uganda

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Abstract

There is a dilemma. University graduates in Uganda experience high levels of unemployment combined with low practical relevance and limited preparation for entrepreneurship during university programmes. In addition, several environmental problems require innovative circular solutions that can create employment. Therefore, the primary objective is to explore this research question: How can the potential of circular entrepreneurship be enhanced through collaboration between academia, industry, civil society and government?

This research will examine the quadro-helix actor groups, in particular academia and industry, and to a lesser extent civil society and government. It also explores how their interactions can strengthen the possibilities for creating innovative circular solutions through entrepreneurship.

Primary data were collected through interviews and observations with academia and industry in Gulu city. Supplementary data was drawn from literature on the role of government and civil society. The conceptual basis is the circular economy, circular entrepreneurship and the Quadro-Helix model. By evaluating the practices of Gulu University and Takataka Plastics, key success criteria for circular entrepreneurship are identified. It also explores the role of government in promoting circular entrepreneurship. Finally, the collaborations and interactions within the Quadro Helix are examined and it is discussed whether this can make circular entrepreneurship appropriate in Uganda.

Keywords

circular entrepreneurship – circular solutions and innovations – Quadro Helix – Uganda – Gulu University – circular business strategies

1 Introduction

Ugandan adolescents struggle to find work. Uganda has a very young population, with almost 75% of the population under the age of 30 (UBOS, 2021). The official unemployment rate is 13% for youth aged 18–30 (National Household Survey, 2019/2020), while other statistics suggest that at least 1/3 of youth are unemployed. According to a national survey, around 40% of male youth are employed and almost half of them is 'own account workers' (self-employed). Among female youth, 30% are employed, 36% are self-employed and 28% are 'contributing family workers' (Annual Labour Force Survey, 2018/19). Self-employment indicates the importance of the informal economy, and that some youth work as entrepreneurs in local communities.

Uganda is a country of entrepreneurs was the headline in the Guardian in February 2016, since 28% of Ugandan adults own or co-own a new business. This headline was based on a ranking in 2015 in the Global Entrepreneurship Monitor (GEM) that is an international survey on entrepreneurship. However, only few of these entrepreneurs survive the first few years.

The reasons for the high unemployment rate are lack of employability skills, lack of access to resources such as land and capital, lack of a comprehensive employment policy, lack of practical skills, etc. (Young Leaders Think Tank, n.d.). One way of overcoming the problems of unemployment and the fact that few young entrepreneurs survive as businesses in the early years is to prepare young people for entrepreneurship.

The Ugandan government has therefore promoted entrepreneurship through industrialisation to ensure inclusive growth and employability. For example, it has reduced the cost of doing business (Uganda National Planning Authority, 2020). Thus, circular entrepreneurship has become an interesting topic for both academia, government and entrepreneurs (Muñoz-Pascual et al., 2019; Ploum et al., 2018; Gast et al., 2017).

Waste management is another major issue in Uganda. The waste management systems in North, South, and West Africa are developing, but the East Africa waste management system is lagging behind. East Africa has the highest rate of open dump sites for waste in Africa (Shi et al., 2021). Waste management systems are challenged in both rural and urban areas although African citizens are producing significantly less waste compared to citizens worldwide. The average daily waste generation per citizen in East Africa was 0.49 kg in 2016 compared to an average of 0.89 kg and 1.2 kg in the Middle East and Europe respectively (Shi et al., 2021). However, waste generation in East Africa is expected to increase, intensifying the already poor waste handling in the region (Aryampa et al., 2019). The amount of waste will continue to increase due to population growth particular in urban areas (Castellani et al., 2022).

To date, many businesses in East Africa have focused on economic growth and with less attention to environmental protection leading to environmental degradation and various social challenges (Chege & Wang, 2020). To address these challenges circular entrepreneurship can be a way to improve the balance between all three pillars of sustainability as well as to create job opportunities for Ugandan youth. Turning waste into a resource and improving entrepreneurial skills in the study programs at different educational levels can help creating circular entrepreneurship, and in this way overcome two key issues in Uganda, youth unemployment and waste management.

Due to the lack of job opportunities for academics in Uganda as well as lack of responsible waste handling, this study aims to address how circular entrepreneurship can be enhanced through curriculum development and collaborations with businesses. The aim is to explore and understand the interdependency and need for collaboration between academia and various actors within circular entrepreneurship.

2 The Background

In this part, the concepts of Quadro Helix, circular economy and the nine levels of circularity are explained. These concepts form the foundation for investigating the environmental pillars of circular entrepreneurship, thus providing knowledge of how to encounter and embrace circular principles in entrepreneurship in northern Uganda.

2.1 *Circular Entrepreneurship in East Africa*

The study is based on the master's thesis *Sustainable Entrepreneurship in East Africa*, written by three master students from Aalborg University in 2023 (Landsvig et al., 2023). The thesis addresses waste and environmental issues, social issues such as inequality and unemployment and economic conditions with a high proportion of the population living in the informal economy and in poverty. These issues are addressed through the problem formulation: *How can the prospects of sustainable entrepreneurship for communities in East Africa be enhanced?*

The interviews and analyses have been used as background to conduct this study. However, the thesis theoretical background and scope is different from this research as the thesis is about both Uganda, Kenya and Tanzania and not just about circular entrepreneurship but about sustainable entrepreneurship. Therefore, the scope has been narrowed for this article to only involve northern Uganda and circular entrepreneurship.

2.2 *Quadro Helix and Problem-Based Learning*

Triple Helix is the connections and interactions between academia, business and government to foster innovation and entrepreneurship (Etzkowitz & Leydesdorff, 1995). There is a need for these three actor groups to work together to make effective changes. Especially these actor groups have important roles, when it comes to innovation and enhancing entrepreneurship. In the case of Sub-Saharan Africa, then it is also important to involve civil society and non-governmental organisations due to their role in the communities, and the amount of youth being 'self-employed' in the informal economy. This has also been referred to as quadro-helix collaboration. These actor groups have separate roles, yet it is necessary in enhancing circular entrepreneurship that these groups collaborate and engage with each other.

Quadro helix also relates to problem-based learning (PBL), which has been explained in Chapter 13 (Jensen et al., 2025). PBL is a learning strategy with focus on solving real-world problems in collaboration with a diverse group of stakeholders depending on the specific problem in question. When working with real-world problems, it is necessary for the universities to engage with local communities as well as businesses and governmental organisations for the solutions to be viable and sustained in the long run.

2.3 *Circular Economy*

The concept of circular economy is based on the principles of refusing, reusing, recycling, and regenerating to keep resources in use for as long as possible, and at the same time minimizing waste and environmental impacts (Ellen MacArthur Foundation, 2019). Entrepreneurs have the potential to establish their businesses on the foundation of circular principles that aim to optimize resource utilization and create economic value.

Circular entrepreneurs can enable businesses to elevate from the traditional linear business model based on take-make-dispose of resources towards a more sustainable model (Geissdoerfer et al., 2018). Circular entrepreneurs have a different perspective regarding focusing on the resource loops within the biological or technical dimensions. Moreover, the focus of circular entrepreneurs can extend to various loops encompassing part and product manufacturing, as well as repair and maintenance services (Ellen MacArthur Foundation, 2019).

2.4 *The Nine Levels of Circularity*

On the journey towards circularity, improved resource usage and waste minimization can be employed as strategies within entrepreneurship. A comprehensive framework known as 'The nine levels of circularity' (shown in Figure 14.1) provides an overview to assess the circularity of strategies and the ability to keep materials and products at the highest possible value.

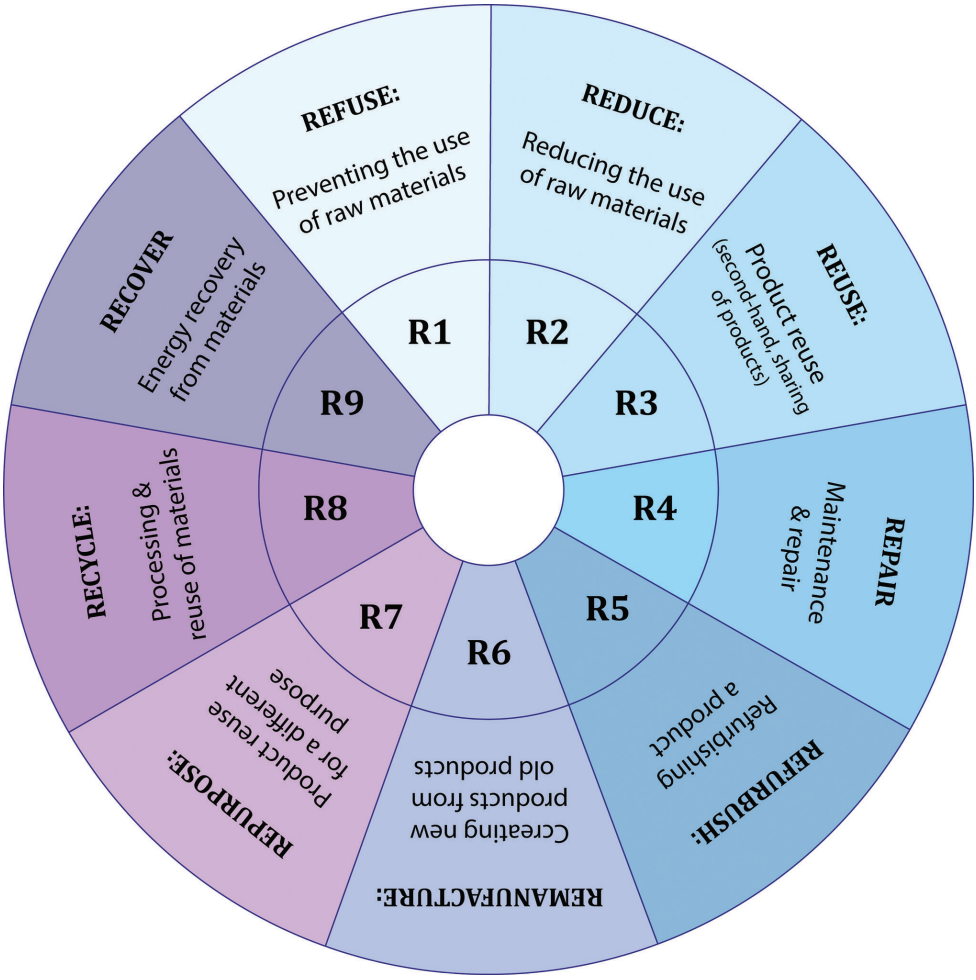

FIGURE 14.1 The 9Rs for circularity (inspired by Rli, 2015)

The framework initially includes levels ranging from the most circular (refuse and reduce) to the least circular (recover) (Rli, 2015). Refuse and reduce are preventive measures, where less resources are used to produce a product, and the same effect can be reached by making durable and reliable products that last longer. Reuse, repair and refurbishment are all extending the lifetime of the product with rather minimal resource use. Remanufacturing and repurposing demand more efforts to retain the value of the product or to change e.g. from being a glass bottle to a drinking glass.

Recycling is related to closing material loops at end-of-life, while with recovering the material is lost (with incineration) or transformed (with composting). Compared to landfilling, recycling or recovering present the better options since waste become a resource. Even though recycling and repurposing may be

classified as lower levels of the nine levels of circularity, this categorization does not imply a lack of sustainability. Recycling and repurposing waste is superior to using virgin materials and waste ending at landfills. Hence, increased circularity leads to more environmental benefits (Potting et al., 2017).

Increasing the circularity of a value chain allows the products to remain in use for longer time, and for materials to be recycled after a product is discarded. This reduces the need for new resources to be extracted and manufactured, which are beneficial for the environment and the economy (Potting et al., 2017). Overall, increased circularity in a product chain reduces the consumption of natural resources and materials, resulting in fewer environmental effects (Potting et al., 2017). Circular businesses can therefore create environmentally sustainable value in a long-term perspective, and narrowing resource loops (Geissdoerfer et al., 2018).

The concepts are used to analyse and assess how different actors can contribute to the enhancement of circular entrepreneurship in Uganda. By applying these concepts to the analysis, the research identifies areas where the waste management systems are superior and areas where they must improve. Moreover, it serves to assess how the actors can actively participate and cooperate in enhancing circular entrepreneurship.

3 Data Collection

This research is conducted based on interviews, observations, and a systematic literature search. The interviews and observations were conducted in Gulu, Uganda, while the literature search was conducted to supplement the data collection.

The actors investigated have been limited to the four actor groups of the Quadro Helix: Academia, Industry, Government and Communities shown at Figure 14.2. Closer collaboration among these groups can form a platform for circular entrepreneurship

The focus is on the groups of actors in the quadro-helix, because interactions between these actors can promote innovation and entrepreneurship (Etzkowitz & Leydesdorff, 1995). Moreover, in the case of Uganda, civil society plays an important role in understanding entrepreneurship because of the dominance of the informal economy. However, the focus of this chapter is on academia, and particularly its interactions with the business community.

3.1 *Interviews*

Interviews with individuals from industry and academia have been conducted to get an understanding of the topic from the actor's point of view. An interview

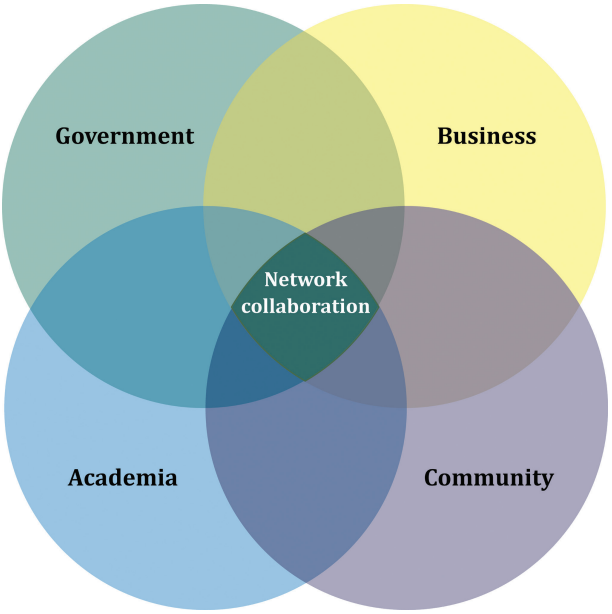

FIGURE 14.2 Illustration of Quadro Helix collaboration

with Peter Okwoko and Paige Balcom, founders of Takataka Plastics, was conducted to include a business perspective. This interview provided insight into how a circular business can be developed, what obstacles exist, and how circular entrepreneurship can have a positive effect on the social sustainability.

In order to obtain data from the perspective of academia, and thus to understand the role of universities in promoting circular entrepreneurship, five interviews were conducted with a BA student, PhD students from the Faculty of Business and Development Studies, the Faculty and Head of Department of Computer Science, and the Dean of the Faculty of Agriculture and Environment (Landsvig et al., 2023). These interviews at Gulu University have provided insight into how the university is working to promote entrepreneurship, the barriers they face in relation to circular entrepreneurship, and the impact of problem-based learning on the outcome. The interviewees also commented on the role of government in promoting entrepreneurship and how this could be optimised based on their perceptions and needs.

3.2 *Observations*

Unstructured observations have been conducted in Gulu, Uganda, to supplement the knowledge from the interviews. Some of these have been conducted simultaneously with the interviews. One observation was conducted at Takataka Plastics to understand how their products are manufactured, and how their business functions. Another was an observation of the waste, infrastructure,

and Takataka Plastics' open containers for collecting plastic bottles in Gulu. The observations have thereby provided an understanding of the problem field by engaging with the local community in Gulu city.

3.3 *Literature Search*

A literature search has furthermore been completed to obtain relevant knowledge about circular entrepreneurship. The literature search has provided knowledge on the role of government and partly of civil society as the two other actor groups of the quadro-helix. Thereby, the literature search has made it possible to obtain knowledge of, for example local policies and regulations that address the environment, entrepreneurship, and businesses.

3.4 *Analysis*

The four actor groups of Quadro Helix all have a role to play in enhancing circular entrepreneurship. Therefore, these actor groups need to assume their responsibility. This section describes how each actor group can enhance circular entrepreneurship and how collaborations between the actor groups can benefit it even more.

3.5 *Industry*

The industry can serve as a source of inspiration to others for circular entrepreneurship, and several opportunities exist to become an inspiring reason for making circular entrepreneurship in practice. The industry can create awareness about the opportunities of circular entrepreneurship by creating internship opportunities for university students. With internships, students can learn business management in practise, and furthermore be exposed to the opportunities of circular business strategies. Moreover, the industry can inspire innovation by inviting students to a tour of their facilities and make presentations of their business at the universities. The industry can also become an inspiring factor by making themselves visible and creating awareness about the advantages of their products to show society that circular entrepreneurship can be a job opportunity.

All these factors are used in practice by the business Takataka Plastics.[1] They are collaborating with Gulu University for the students to do internships at Takataka Plastics, which has led to a drive of circular entrepreneurship by the students. This has also been an advantage for Takataka Plastics to learn from the students and get new ideas for improvements of products and techniques. Besides, Takataka Plastics creates awareness about circular entrepreneurship for students from different schools with tours of their facilities.

> At Takataka Plastics we invite the local schools; both on primary, secondary, college and university level, to get a tour or we go out to teach at the schools. We also teach in the communities and facilitate clean ups. We use a method where we try to 'scare' the locals, because it is what works. Therefore, we talk on their level and talk about plastic pollution, cancer, yellow fever, goats and cattle dying from eating plastic, but we also show our recycled products, so the locals become proud. – Peter Okwoko, Takataka Plastics. (Landsvig et al., 2023)

As part of their teaching, Takataka Plastics does also highlight the importance of the circular principles of refuse, reduce and reuse. Takataka Plastics has furthermore become visible in society, by implementing containers for the locals to deposit their used plastic bottles. With the visibility, they can inspire potential entrepreneurs in the city, which is also seen as Takataka Plastics is getting a lot of job applications. Thus, Takataka Plastics is a great example of the mentioned inspiring factors that can enhance circular entrepreneurship.

The industry cannot include all nine levels of circularity in their business models simultaneously. Yet, when acknowledging waste as a resource, it is possible to have a business strategy, where discarded resources are given a new life. This is both an economic and environmental advantage, because these resources are cheap or free, and they are then not becoming waste in nature. Takataka Plastics is an example of a business giving the resources a new life. They collect plastic bottles in containers and recycle the plastic bottles into e.g. tiles for bathrooms or kitchens. In Gulu, the number of plastic bottles in nature has decreased. Thus, this business example shows the opportunities of using circular business strategies that have advantages for both the environment and the employment rate.

Therefore, the role of the industry in enhancing circular entrepreneurship is to inspire and show the potentials for new entrepreneurs to establish circular businesses.

3.6 *Academia*

The resources and outreach possibilities are available within Academia that can improve knowledge about circular entrepreneurship through education. Universities are actors within academia as they have a wide audience and facilities to provide the needed knowledge and skills to do circular entrepreneurship. General knowledge about entrepreneurship, business management, and the advantages of entrepreneurship is needed among students, and universities can provide this knowledge through lectures and workshops. Besides,

lectures about circular economy are not common at East African universities however circular economy could be a part of the curriculum of the universities especially the faculties of business and development as well as agriculture and engineering. Problem based learning (PBL) is a way to engage students in potentially becoming entrepreneurs. With PBL the students learn how to analyse and solve real-life problems by exploring problem fields, working result-oriented, and in teamwork. Internships and field trips, likewise, provide the students with knowledge and skills to do entrepreneurship and prepare them for the labour market.

Some faculties at Gulu University are practicing PBL and preparing students for the labour market with internships and field trips. PBL has been implemented at several faculties to provide reality in the lectures and the students learn how to analyse and solve real-life problems. Besides the implementation of PBL has led to a two-way learning process with students presenting for the teachers and both parties are gaining new relevant knowledge. The students become more independent and critical thinkers, because the students are experiencing real-life problem cases, and the two-way communication makes also a safe space for discussions (Interview with Dean at Gulu University in Landsvig et al., 2023).

At Gulu University, the students collaborate with the industry and the local community in internships and problem-solving projects. This is for the students to understand the problems in real life and how to solve them, which in the long run can encourage entrepreneurship. Some students at Gulu University have initiated their own innovations. An example is a group of students making an app to track transport because they saw a problem of people spending a lot of time waiting for busses. This does not relate to circularity, yet it shows that students leave the university with the knowledge and skills to do entrepreneurship. This is emphasized by one of the faculty and Head of Department:

> In general, we try to make the students come out of the university as much as possible and engage with the society and build solutions for people. […] In the beginning, we tried to build solutions for a given problem, but now we see a need for a broader perspective and involvement of the local communities that we are creating solutions for. – Faculty and Head of Department, Gulu University. (Landsvig et al., 2023)

Thereby the role of academia is to give potential entrepreneurs in terms of students the knowledge, skills, and practical mindset to engage in entrepreneurship and include circularity in their business models. With the numbers of existing entrepreneurs failing within the first years, then there is also

a need for Open Education and special courses to support the entrepreneurs and inspire new ones.

3.7 *Government*

The government and local authorities are an actor group that must be considered when enhancing circular entrepreneurship as they can promote circular entrepreneurship through regulations, policies, and making resources available. With their means, the government can support aspiring entrepreneurs in innovation by making space and providing grants. According to one of the interviewees it is essential to have a tradition in the local community where students can innovate and adjust business ideas. 'The government should make it easier by creating an environment where people can come and innovate. […] The government and also universities need to facilitate space and grants'. – Faculty and Head of Department, Gulu University (Landsvig et al., 2023).

Such a breeding ground for circular entrepreneurship can be fostered by regulations made by the government. Yet the regulations must be carefully implemented as they can delay innovative thoughts and solutions to current issues. An example is the banning of plastic bags, which has been a subject in the Ugandan Government for 15 years (Behuria, 2021). Instead of only implementing a ban, the government could have benefited from preparing the community on how to create circular businesses from the ban on plastic bags, hence fostering the innovation of alternatives. Thus, the government could have applied strategies such as refuse and reduce, while simultaneously enhancing circular entrepreneurship by providing funds for innovating alternatives based on natural and local resources.

This is rather essential as most businesses are 'killed' at an early stage, due to the regulations and tax systems that do not enhance micro, small, and medium-sized enterprises. (Faculty and Head of Department, Gulu University in Landsvig et al. 2023). However, more frameworks promoting entrepreneurship in Uganda have been developed but need financial backing for actual to work (Odongo, 2019). Meanwhile, most businesses in Uganda are in the informal sector, meaning that they do not follow the tax system and regulations (Deléchat & Medina, 2020). Therefore, the government needs to consider how to include the informal sector in their regulations as the informal sector is such a large part of the working force in Uganda. The UNCTAD has supported Uganda in developing strategies and regulations to enhance entrepreneurship, but there is a need for the government to follow it through (UNCTAD, 2022).

Therefore, the role of the government is to enhance circular entrepreneurship by supporting it financially, making room for innovation, and implementing strategies and regulations that make it possible for businesses to sustain.

3.8 *Collaborations*

Every actor group has their different resources and roles in enhancing circular entrepreneurship. The industry's role is to pave a path to innovation by becoming a source of inspiration for other businesses, hence both inspiring start-ups and existing businesses to become circular. Academia must proactively provide knowledge and skills regarding entrepreneurship as well as circular strategies. Besides, engaging more in PBL and internships will let the students understand and experience working with real-life problems. Likewise, academia must facilitate relationships and partnerships among the industry, academics, and the government to fulfil the need for circular entrepreneurship, where all actors and interests are engaged. Accordingly, the government must adjust the legislation to facilitate the possibilities of entrepreneurship and in particular circular entrepreneurship.

These different actors will have to be involved and interact to enhance the potentials of circular entrepreneurship. Similarly, the different actor groups can have different roles and address diverse strategies of the nine levels of circularity. The preventive strategies of refuse and reduce have potentials for existing businesses to become more eco-efficient by reducing impact on the environment and at the same time save money. Furthermore, the government can create incentives for industry to work with preventive strategies and reduce the use of resources such as water, energy, etc. and refuse the use of dangerous substances. The industry can significantly affect the other strategies by extending the lifespan of products through repair, reuse and refurb strategies. This is already common circular strategies in East Africa mostly within the informal economy. However, circular entrepreneurship has the potential to become more systematised and innovative, by support from universities and public authorities. Takataka plastics is a showcase of how plastic waste can be transformed into products, and of the benefits of collaboration with Gulu University. Besides, the case also shows how civil society can benefit and contribute to such circular entrepreneurship.

Circular entrepreneurship can thus appear in many guises leaving potentials for different circular strategies. Innovation can be fostered by the interactions and involvement of the quadro-helix actors and can take place between businesses as well as with knowledge institutions.

'For Community Transformation' is the motto of Gulu University, and circular entrepreneurship is a potential source of innovation that can transform the local communities and benefit both businesses and governmental authorities. Quadro helix collaborations are key to enhancing the conditions of innovation and this can be formalised by establishing networks and hubs among the different actors since this can provide improved opportunities for innovation – more than any of the single actors alone (Etzkowitz & Leydesdorff, 1995).

4 Discussion

This study has explored how the actor groups of the quadro-helix – academia, civil society, government and industry – can enhance the opportunities for circular entrepreneurship, thereby bridging the gap between obvious environmental problems and the need to create employment, especially for the youth in Uganda.

Although the study included relevant groups of stakeholders, other stakeholders could have been included. Universities and their role in promoting circular entrepreneurship are important, especially in ensuring higher levels of innovation and product quality. However, many more actors and other types of schools for younger students can also teach young people to understand how waste can be turned into a resource and the various job potentials related to extending the life of products through repair and reuse. There are several ways to create the mindset, knowledge and tools for young people to become circular entrepreneurs later in their lives.

In Zanzibar, Kawa Training Center educates young students with the purpose to becoming tour guides, entrepreneurs, or working at the hotels. At this school, the students are learning how to use waste as a resource, by doing beach clean-ups and using the materials to make new products. Besides, Kawa Training Center takes the students to markets for them to sell their products. Existing technical and vocational training schools in Uganda could also prepare younger students to become circular entrepreneurs in the future.

In Nairobi Kenya, many hubs exist related to circular businesses for example Circular Innovation Hub that is a platform for circular businesses, where start-ups can meet, develop, exchange experience, and become recognised (Circular Innovation Hub, n.d.). They have programs that address challenges experienced by circular businesses covering various topics such as marketing, fundraising, upscaling, relevant staff, and pitching.

National governments have a role to play in creating the framework conditions for entrepreneurship, but local governments also have an important role, as they are responsible for resource and waste management. The national government has the ability to impose sanctions and provide incentives, e.g. through support programmes, while local governments are closer to communities and local actions. Local governments should recognise the environmental and employment benefits of promoting circular entrepreneurship, which can be done by creating challenges and competitions for young people, as well as supporting training and financial conditions.

Industry is a relevant actor in circular entrepreneurship, as in the case of Takataka Plastics. Similar cases of waste to resources can be established, for

example by converting agricultural waste into bio-briquettes and 'green charcoal', as another project at Gulu University is investigating. Furthermore, many actors in communities are involved in repair, reuse and other types of service provision. There are many opportunities to improve these services within the circular economy, and it may be beneficial also to investigate these options.

This research has been limited to parts of the Quadro Helix and, in particular, from the perspective of universities, while the role of civil society, government and industry has been less explored. However, the local community has an important role to play – also in collaboration with academia, industry and government, given the dominance of the informal economy in Uganda. More attention to local communities could lead to stronger analysis and results, as the local community need to take part in the transition to circular entrepreneurship. Without the understanding and support of civil society for circular entrepreneurship, it will be difficult for businesses to survive in the long run.

Products based on waste materials can be difficult for the locals to understand, because they see waste as waste and not as a possible resource. Peter Okwoko, from Takataka Plastics, elaborates this: 'We have a hard time convincing the locals that a recycled based product also can be a good product as there is low trust in the recycling and a common perspective of it is not sustainable' (Landsvig et al., 2023). In order to enhance circular entrepreneurship, the local community needs to be involved and see the advantages of using waste as a resource. Takataka Plastics is involving the local community by employing local youth, and this is a way to enhance trust and build a commitment with the local community.

Another reason why the local community is important in promoting circular entrepreneurship is that they are close to the local problems related to waste and resources. Citizens also need to be involved in developing solutions to ensure local support. There is a lack of job opportunities for both academics and non-academics, so solutions for both groups need to be explored, and thus the quadro helix perspective can benefit this research.

In general, the opportunities to promote circular entrepreneurship can come from many more and different actors than those addressed in this study.

5 Conclusion

Uganda is struggling with both improper waste management and unemployment. To improve the waste management system, circular business strategies can be implemented in Uganda. This can create more employment by using waste-to-resources in entrepreneurship, and by improving existing and new business strategies related to repair, reuse and retrofitting.

The study of the actors within the quadro helix: industry, academia, civil society and government, showed that there is a need to involve all groups of actors to promote circular entrepreneurship and thereby create employment opportunities for Uganda's youth, as the informal economy is dominant. Through literature review, interviews and observations, the role of each stakeholder group was analysed, and solutions were identified on how to promote circular entrepreneurship.

Industry can promote circular entrepreneurship by inspiring and training potential entrepreneurs. This can be done by inviting visitors to their company, taking in interns from the university, and employing local citizens. Academia has the knowledge and outreach possibilities. By educating students about problem-based learning, entrepreneurship, and circular economy, students get knowledge that can be used to create circular business strategies. Besides, universities can advance circular entrepreneurship by having students analysing real life problems and come up with viable solutions. Making projects and doing internships in businesses are ways to boost this. The Government has the power to promote circular entrepreneurship through regulations, policies, and providing resources. To create circular entrepreneurship, the entrepreneurs need improved conditions through tax systems adapted to circular entrepreneurship and physical conditions such as workspaces and grants.

However, the different actors cannot create circular entrepreneurship by working independently, the chances of survival can be improved through collaboration and engagement with each other in partnerships and/or in networks. The actor groups have different strengths to increase circular entrepreneurship both related to resources, power, knowledge, and outreach possibilities. Besides, the circular strategies address different challenges, and to create circularity all the strategies need to be implemented at different levels. Actors need to work together, take responsibility and use their strengths to promote circular entrepreneurship in Uganda.

This research did not cover all groups of actors within the Quadro Helix. Therefore, further research is needed on more actors in the Quadro Helix and especially on how to involve the local community in promoting circular entrepreneurship in Uganda.

Note

1 Takataka Plastics is a business located in Gulu, Uganda. They recycle plastic bottles into tiles that can be used for kitchens and bathrooms.

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