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AI FOR SOCIAL GOOD: SENTIMENT ANALYSIS TO DETECT SOCIAL CHALLENGES IN SOUTH AFRICA

Stellenbosch, South Africa
December 7, 2022

AGENDA

1

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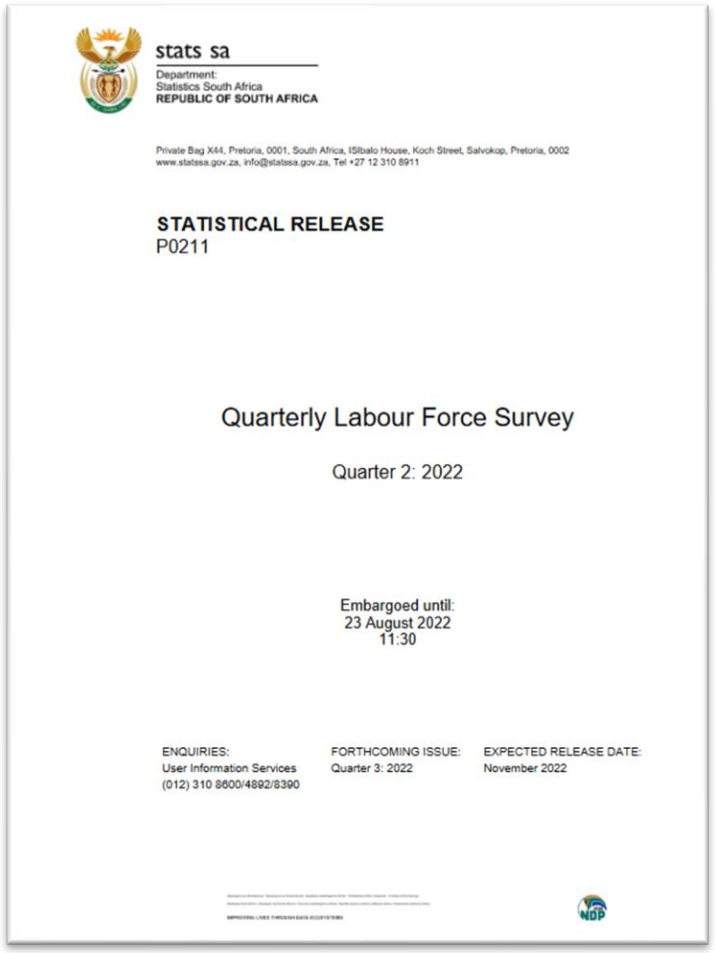
INTRODUCTION

MOTIVATION: Soc. Challenges in South Africa



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South Africa's Challenges of Realising her Socio-Economic Rights

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Abstract

Homelessness and poverty are huge challenges in South Africa. These social problems manifest themselves in poor housing. Inadequate and poor housing structures coupled with illegal land evasions as well as evictions have characterised the society since the Verwoerdian era and even during the new democracy. The ANC led government declared housing one of its constitutional mandate. Provision of the state's low cost housing is seen as a panacea to homelessness, inadequate housing and poverty. The fact that the democratic government declared housing a priority area, in itself gave birth to different perceptions in the minds of many people. Some people are occupying land illegally, which often municipalities will launch counter initiatives to evict them and take them to areas suitable for human settlement. Such an intervention is often fought fiercely by affected residents. There are people who believe that they can occupy any available vacant land because the Constitution of South Africa puts provision of adequate housing upon the state. This study used a qualitative research methodology in gathering data in the affected areas of Limpopo Province, South Africa. Providing housing continues to be contested and the battle does not seem to have been won. Despite the challenges of the state, a framework has been established for the future.

Keywords: Homelessness, apartheid, mekhukhu, democracy and South Africa

1. Introduction

South Africa as a developing country has a housing market that is skewed. The country experiences a huge housing backlog, which is often a distinct character in all developing countries. Developing countries attribute their inadequate housing and poor infrastructural development to underdevelopment. The Neo-Marxist theorists, most of whom may be regarded as proponents of the dependency theory in one form or another claimed that imperialism and colonialism have impeded progress throughout the Third World (Martinussen, 1997). This creates unequal relations between developed and developing countries. The unequal power relations between developed and developing countries has a negative impact on service provision in less developed countries like South Africa. In addition, South Africa was subjected to Verwoedian system which promoted migrant labour system. The migrant labour system created a need for housing in towns and cities. When more people travel to the cities in search of jobs, they were confronted with a critical housing shortage. They then came up with alternative means to construct cheaper housing structures. These people constructed dwellings from all varieties of materials which are frequently unsuitable for construction designs. For example, they use tins, pieces of plastic and low quality wood (Cloete, 1993). The use of unsuitable building materials to erect houses are equally a consequence of poverty and landlessness.

The Verwoedian government fought the shack dwellers with all its power. This created conflict between black people and the Verwoedian administration. The apartheid government resorted to evictions, removals and the enforcement of the Group Areas Act of 1950. The evictions affected the political landscape of the country. People's hopes rested in the violent conflicts which tragically characterised so many informal settlements since the mid-1980s (Smith, 1992). Evictions failed to resolve the problem of informal settlements as evictees continued to invade spaces near cities and forcefully sought to be part of the city settlements. The landless always resort to violent means to fortify their stay on invaded land. While some especially class issues were taken up, the campaigns, as a whole, were not overtly class based, on the common oppression of black people, especially African people under white rule (Marks, 1987). The unequal power relations between developed and developing countries further spiralled to unequal level of development

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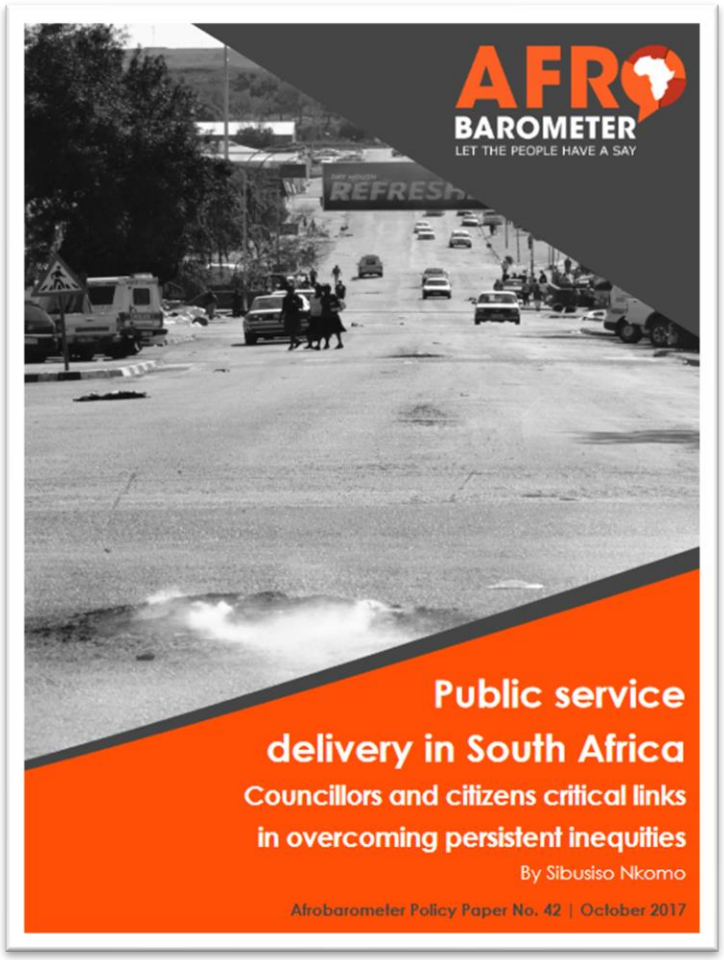
900



HIGH UNEMPLOYMENT RATE, POOR CONDITIONS IN HEALTHCARE FACILITIES, LACK OF EDUCATIONAL TOOLS, LACK OF WATER, ELECTRICITY & SANITATION

+

MORE CHALLENGES

Image and Text Sources: Quarterly Labour Force Survey – Quarter 2: 2022 (2022), Lorraine & Molapo (2014); Nkomo (2017).

MOTIVATION: Country Report & SDGs

+

SUSTAINABLE DEVELOPMENT GOALS

JOB CREATION

ELIMINATION OF POVERTY

REDUCTION OF INEQUALITY

GROWING AN INCLUSIVE ECONOMY

74% CONVERGENCE

Image and Text Sources: Sustainable Development Goals: Country Report 2019 – South Africa; United Nations: Sustainable Development Goals: 17 Goals to Transform our World (2021).

MOTIVATION: Departments & SDGs

employment & labour
Department:
Employment and Labour
REPUBLIC OF SOUTH AFRICA

small business development
Department:
Small Business Development
REPUBLIC OF SOUTH AFRICA

education
Department of Education
REPUBLIC OF SOUTH AFRICA

transport
Department:
Transport
REPUBLIC OF SOUTH AFRICA

correctional services
Department:
Correctional Services
REPUBLIC OF SOUTH AFRICA

home affairs
Department:
Home Affairs
REPUBLIC OF SOUTH AFRICA

agriculture, land reform & rural development
Department:
Agriculture, Land Reform and Rural Development
REPUBLIC OF SOUTH AFRICA

water & sanitation
Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

health
Department:
Health
REPUBLIC OF SOUTH AFRICA

agriculture
Department:
Agriculture
REPUBLIC OF SOUTH AFRICA

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SUSTAINABLE DEVELOPMENT GOALS

MANDATE TO SUPPORT

Image and Text Sources: South African Government: National Departments (2022); United Nations: Sustainable Development Goals: 17 Goals to Transform our World (2021).

MOTIVATION: How to react quickly?

+

SUSTAINABLE DEVELOPMENT GOALS

• • •

HOW CAN THE DEPARTMENTS BE INFORMED PROMPTLY ABOUT THE CURRENT SOCIAL ISSUES THAT AFFECT THEM, SO THAT THEY CAN THEN REACT QUICKLY?

Image and Text Sources: South African Government: National Departments (2022); United Nations: Sustainable Development Goals: 17 Goals to Transform our World (2021).

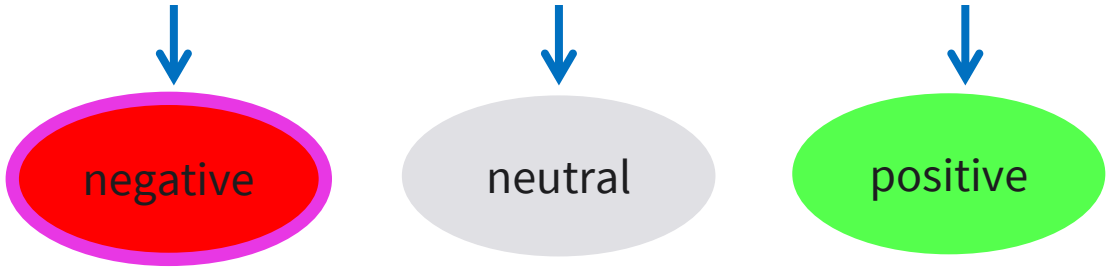
SENTIMENT ANALYSIS: English

automatically detecting a sentiment from textual information and then classifying the information into classes, e.g., classify tweets with government department related topics.

home affairs
Department:
Home Affairs
REPUBLIC OF SOUTH AFRICA

"The queue in home affairs at Wynberg is very slow one cannot get anything without waiting the service is bad."

twitter



SENTIMENT ANALYSIS CAN HELP

Image and Text Sources: South African Government: National Departments (2022); Mabokela & Schlippe (2022); Twitter (2022).

SENTIMENT ANALYSIS: Sepedi & Setswana

extracting subjective information from text such as mood,
e.g., classify tweets with government department related topics.

water & sanitation
Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

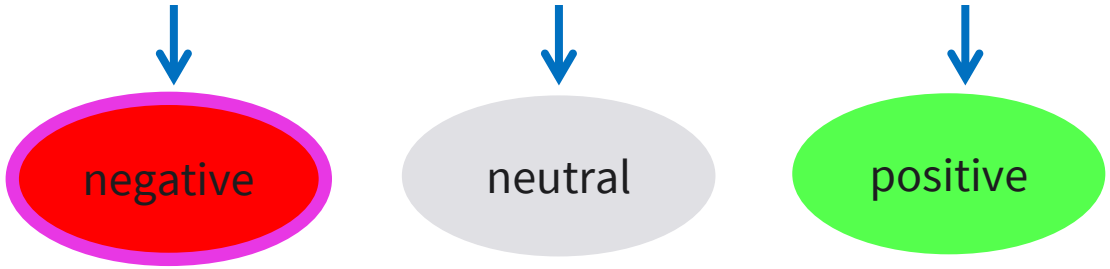
Ke neng re lla ka mohlagase le makhura tsa go tura.

I was crying about expensive electricity and fuel

health
Department:
Health
REPUBLIC OF SOUTH AFRICA

Puso ya rena ya ANC ga e re hlokomele ka tsa maphelo.

Our ANC government does not take care of our health



BANTU LANGUAGES ON TWITTER

Image and Text Sources: South African Government: National Departments (2022); Mabokela & Schlippe (2022).

2

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RELATED WORK

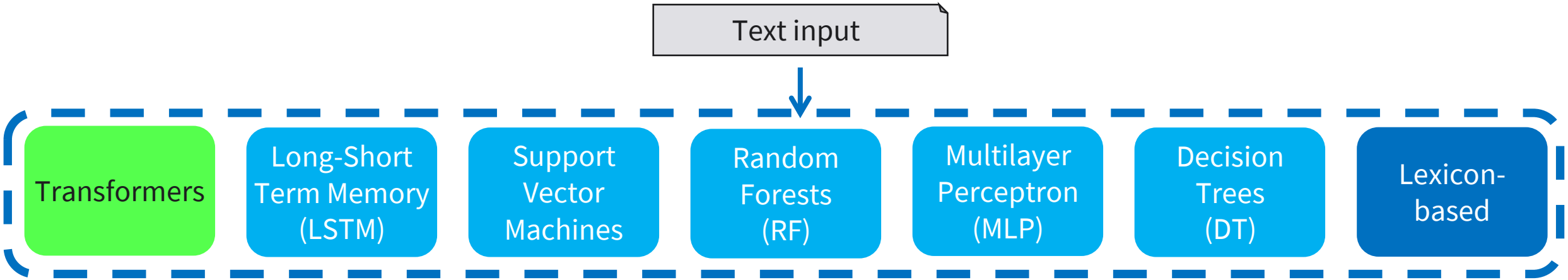
RELATED WORK: AI for Social Good

- ✓ address significant social, environmental and public health issues that are facing society (Cowls et al., 2021)
- ✓ intersection of AI with social sciences, health sciences as well as environmental sciences (Tomaev et.al., 2020)

e.g.,

Kiritchenko & Mohammad (2018); Kaur & Sharma (2020)

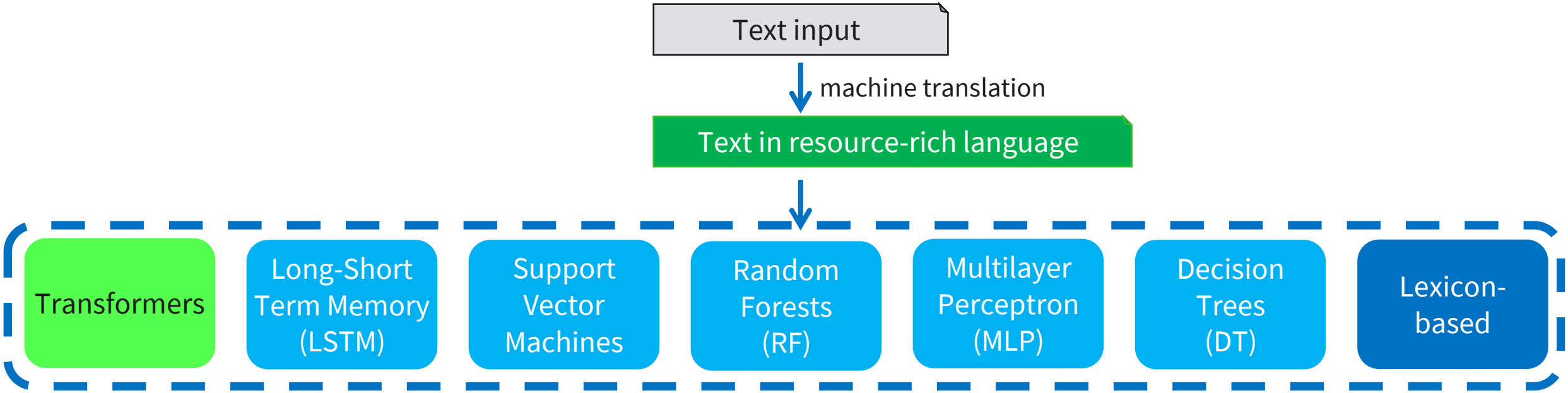
RELATED WORK: Sentiment Analysis



Balahur and Turchi (2014), Nguyen et al. (2018), Kumar and Sharan (2020), Rakhmanov (2020), ...

Kolchyna et al. (2015), Kotelnikova et al. (2021), ...

RELATED WORK: Cross-lingual Sent. Analysis



Balahur and Turchi (2014), Lin et al. (2014),
Vilares et al. (2017), Can et al. (2018)
...

UNDER-RESOURCED LANGUAGES

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EXPERIMENTAL SETUP

SYSTEM PIPELINE

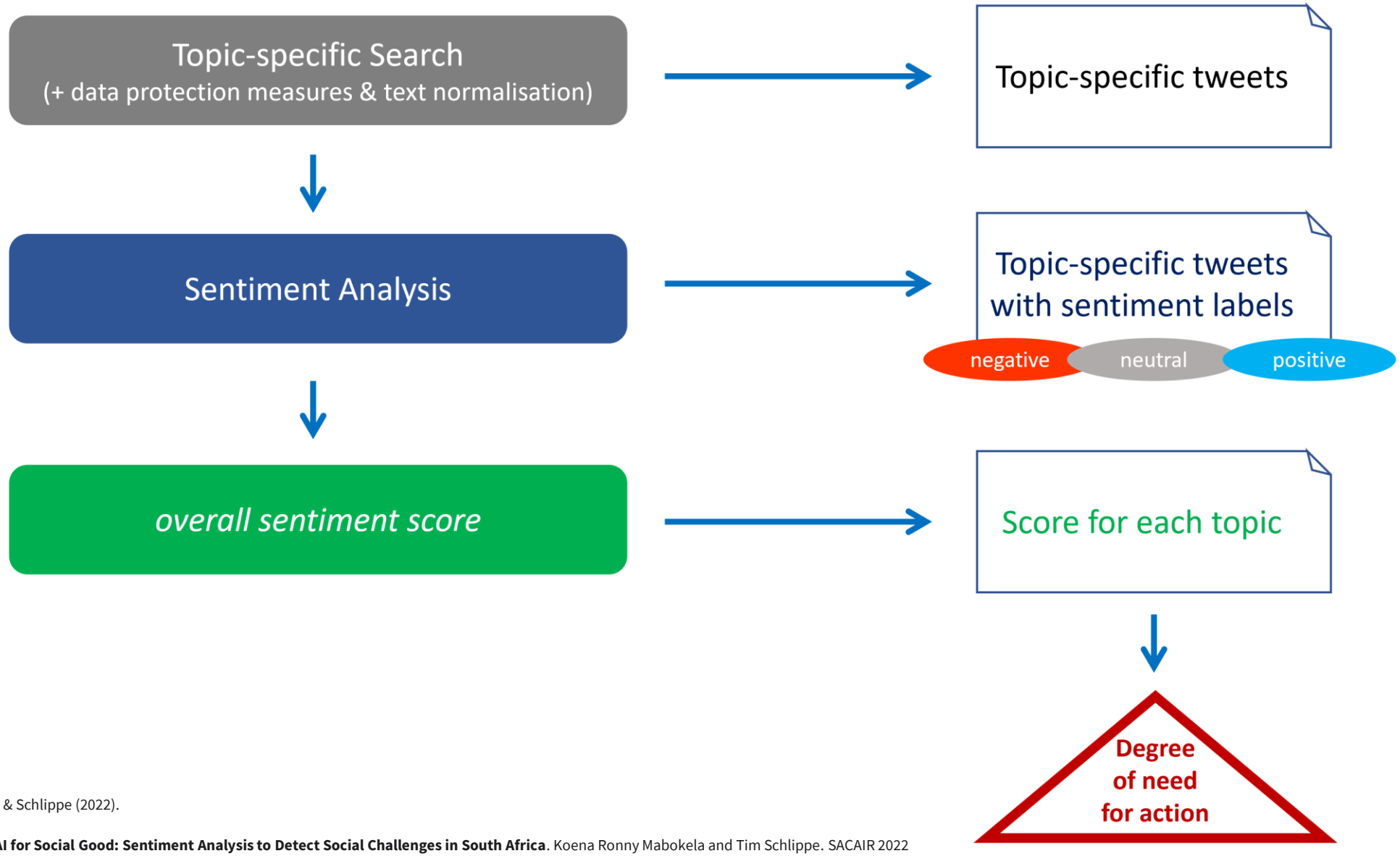


Image Source: Mabokela & Schlippe (2022).

SENTIMENT ANALYSIS

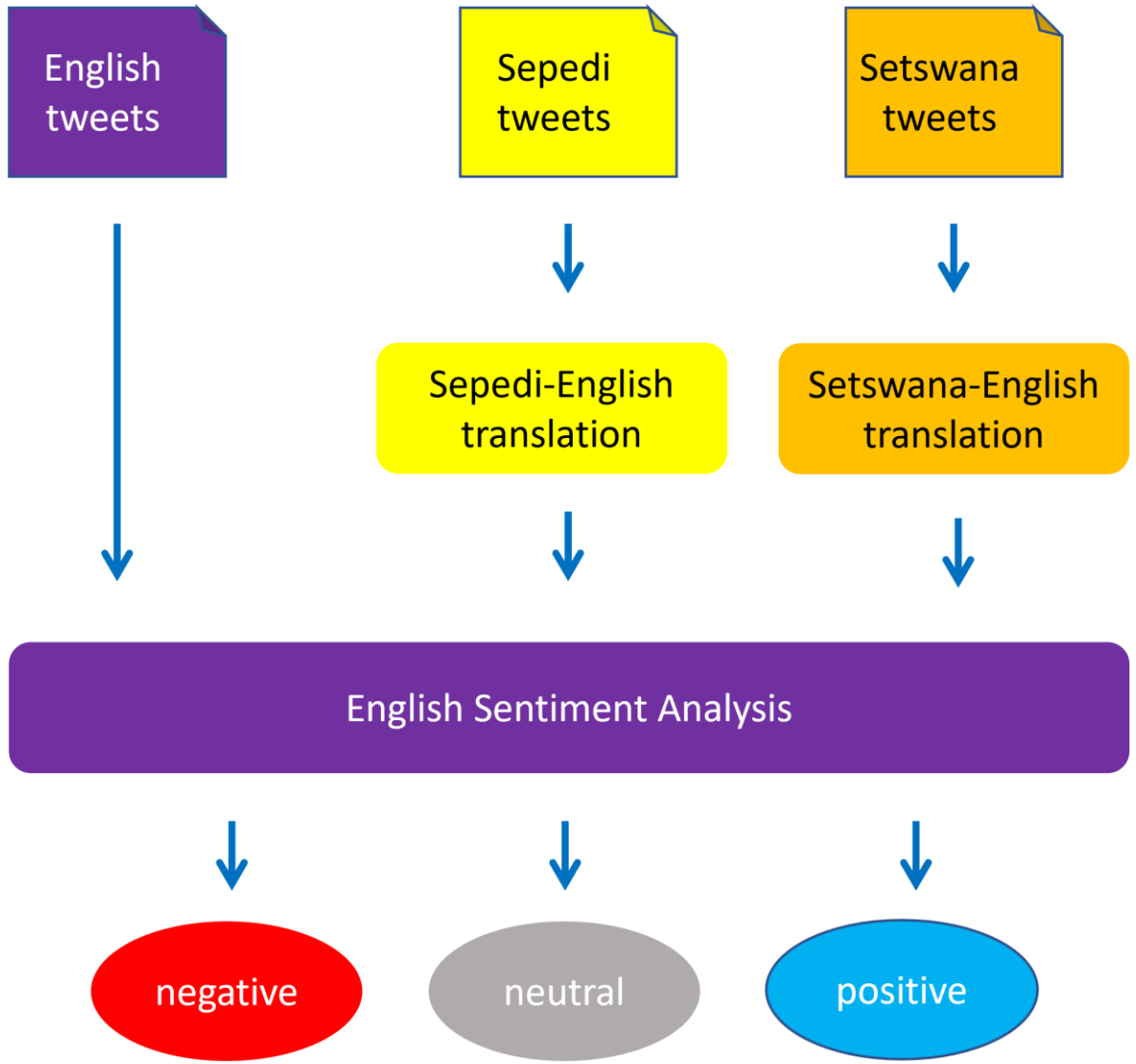


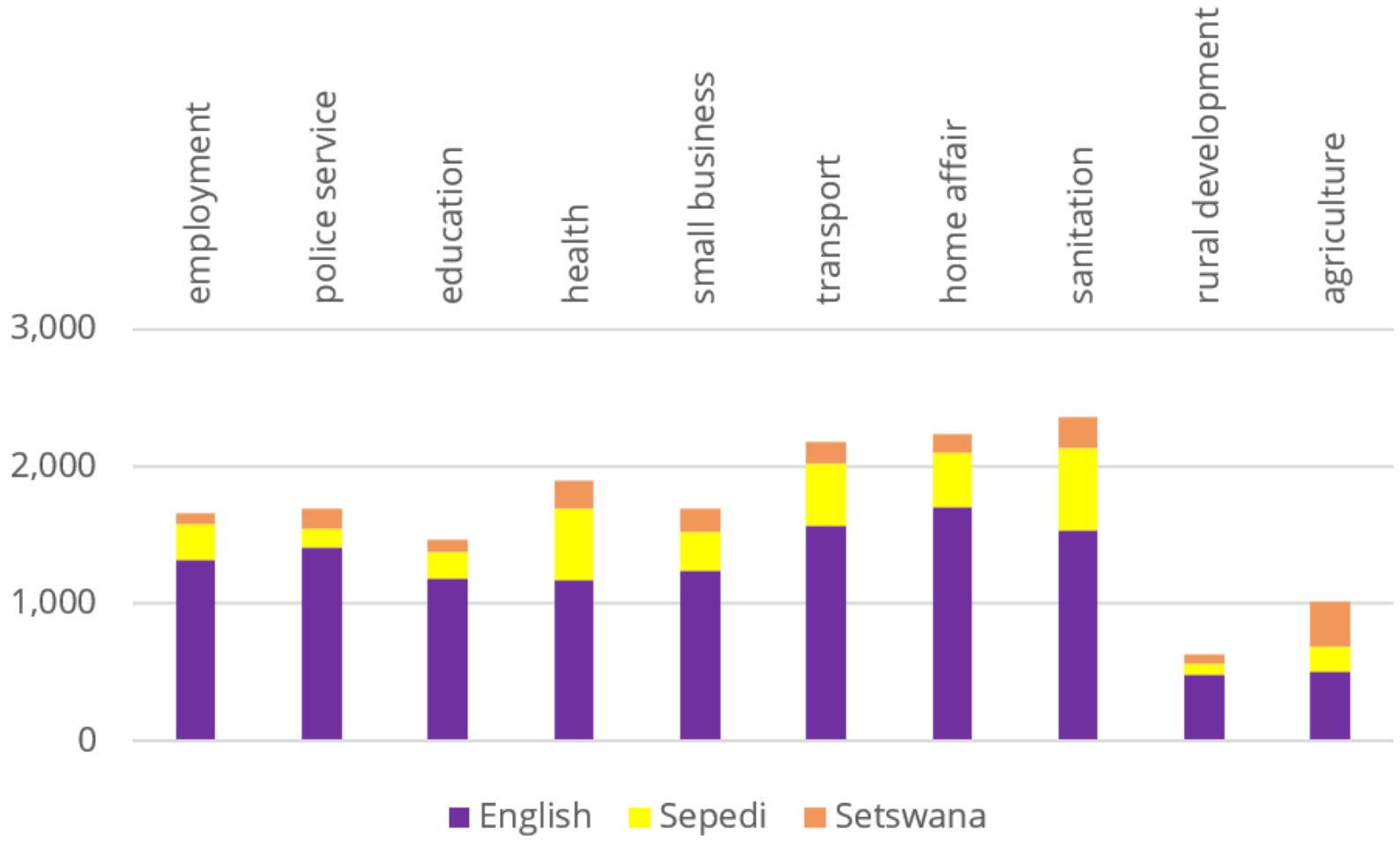
Image Sources: Mabokela & Schlippe (2022).

PERFORMANCES ON SAFRISENTI TEST SETS

System	Accuracy (%)	F-score (%)
English	86.36	86.01
Sepedi	84.19	84.03
Setswana	83.26	82.74

EXPERIMENTS AND RESULTS

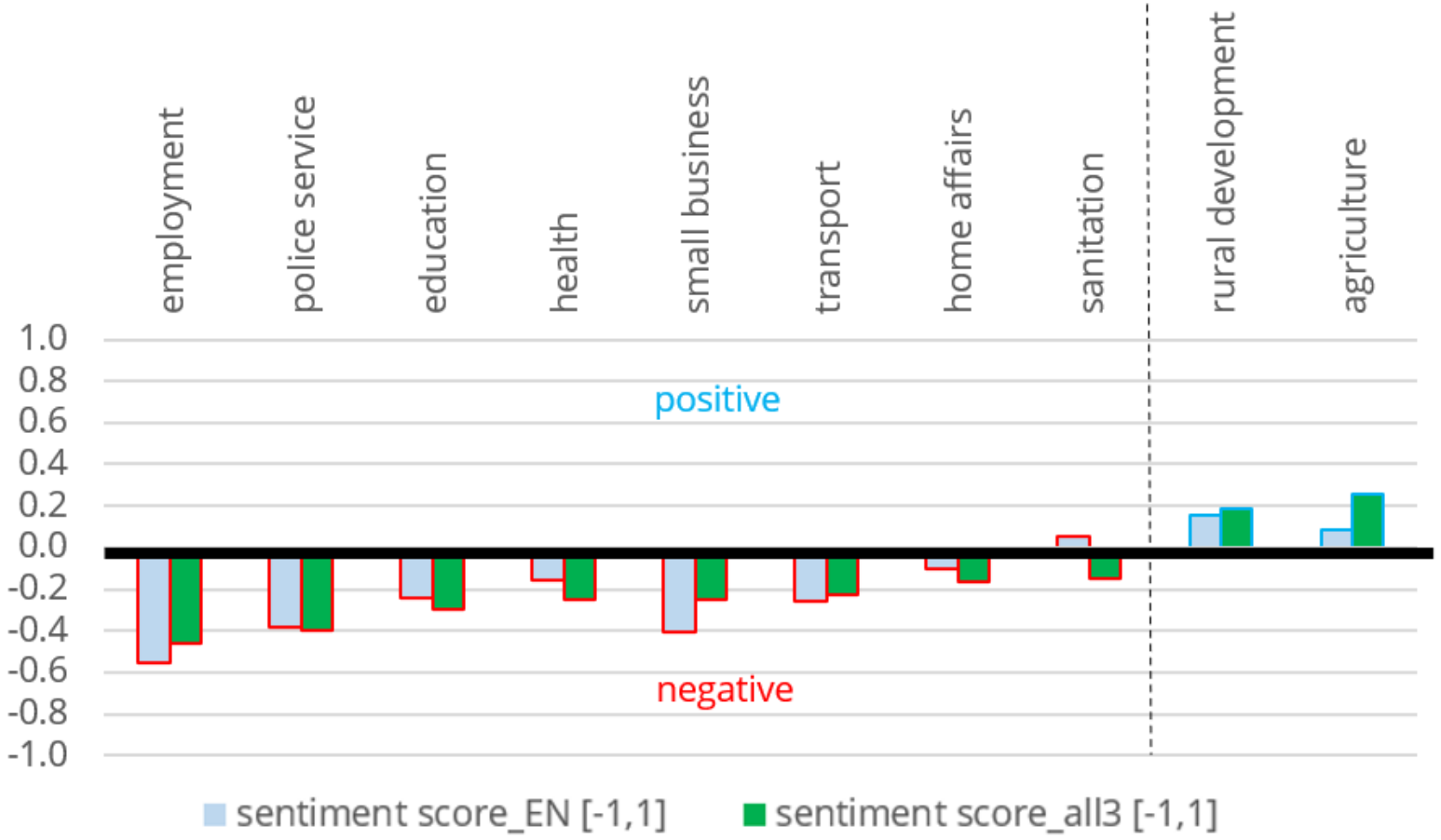
TWEETS over languages & topics



16,787
TWEETS COLLECTED

Image Source: Mabokela & Schlippe (2022).

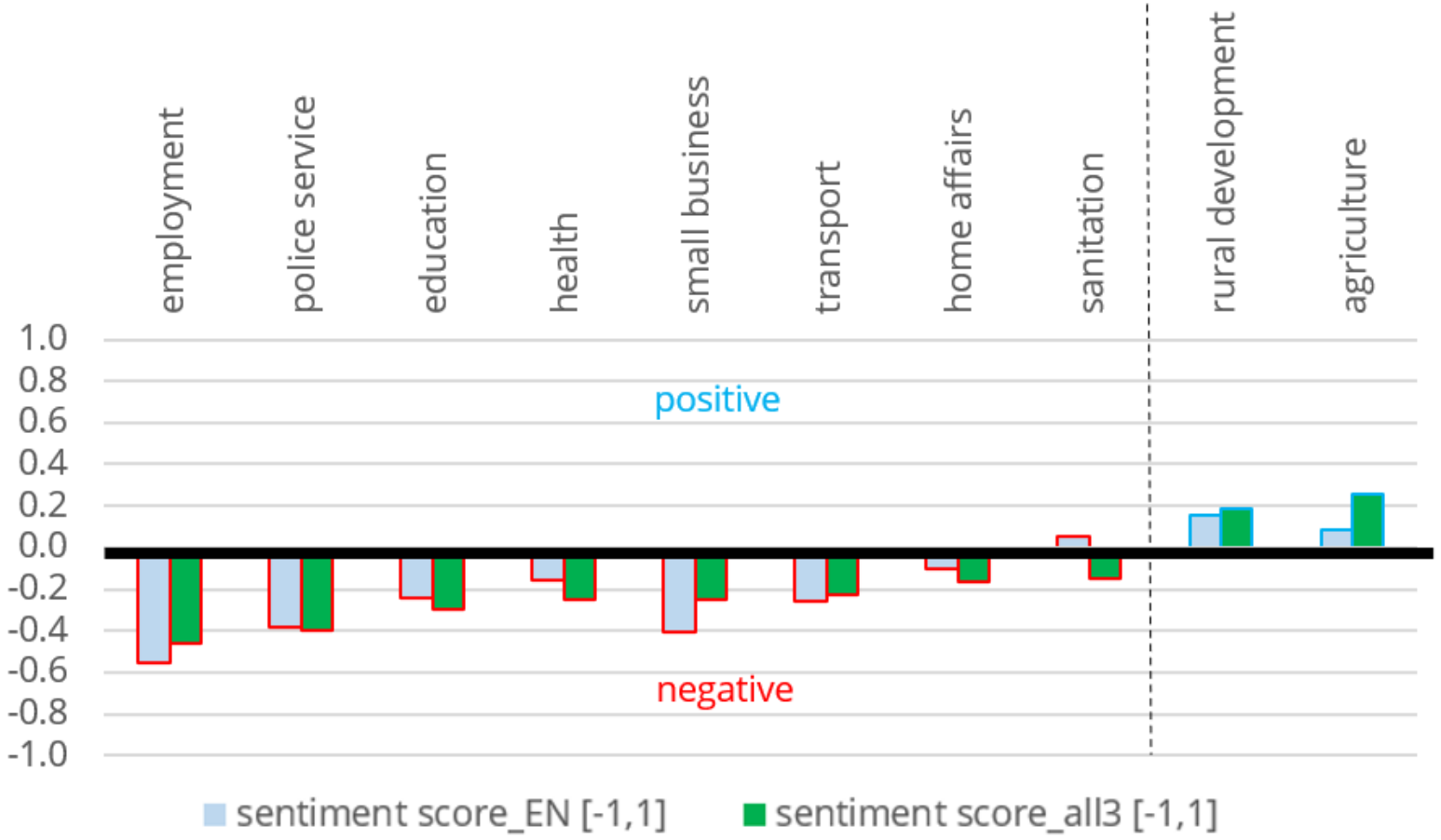
OVERALL SENTIMENT SCORE



$$\frac{\#negative * (-1) + 0 * \#neutral * (+1) * \#positive}{\#allsentiments}$$

Image Sources: Mabokela & Schlippe (2022).

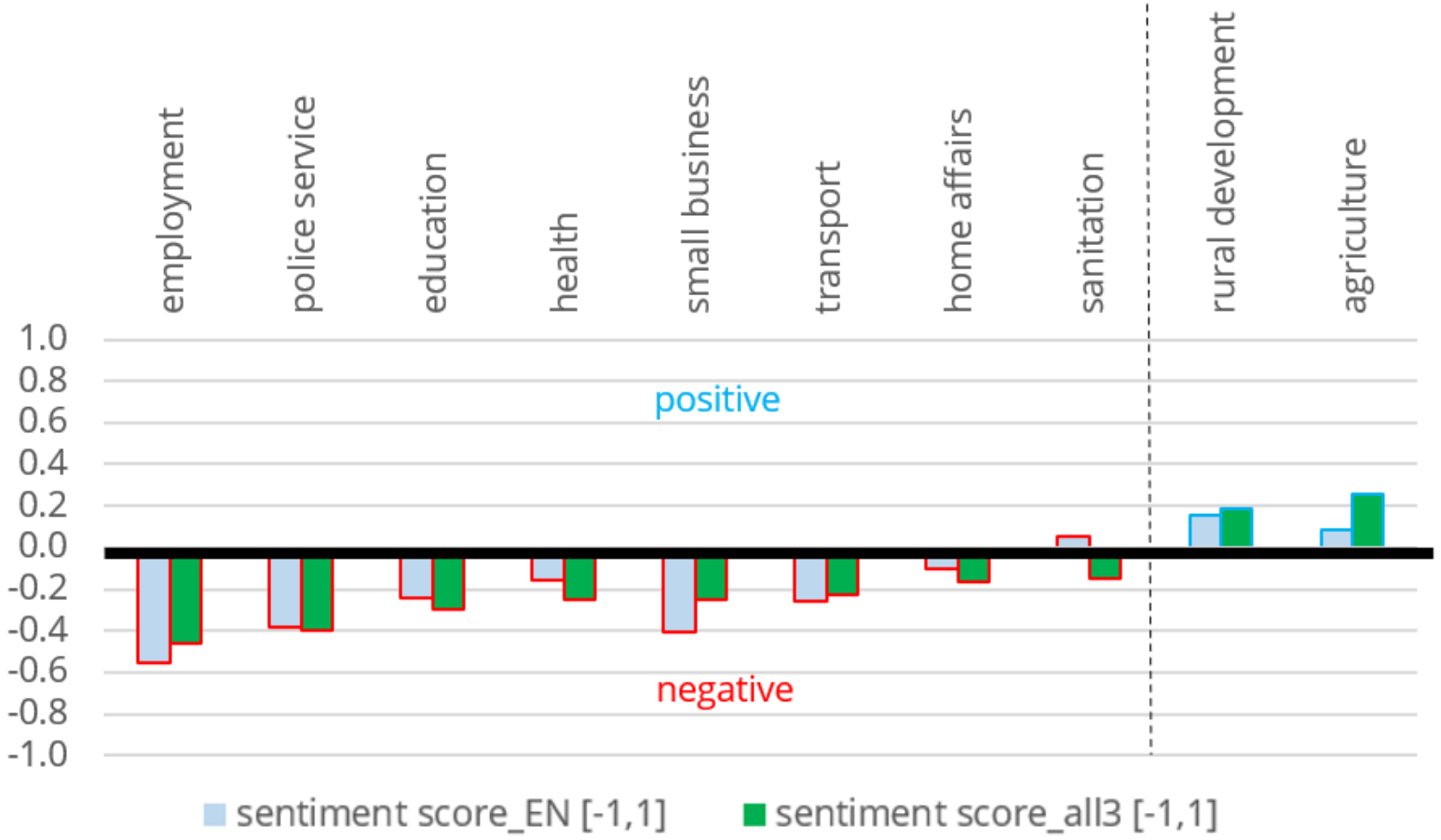
OVERALL SENTIMENT SCORE



8 OF 10 TOPICS
NEGATIVE

Image Sources: Mabokela & Schlippe (2022).

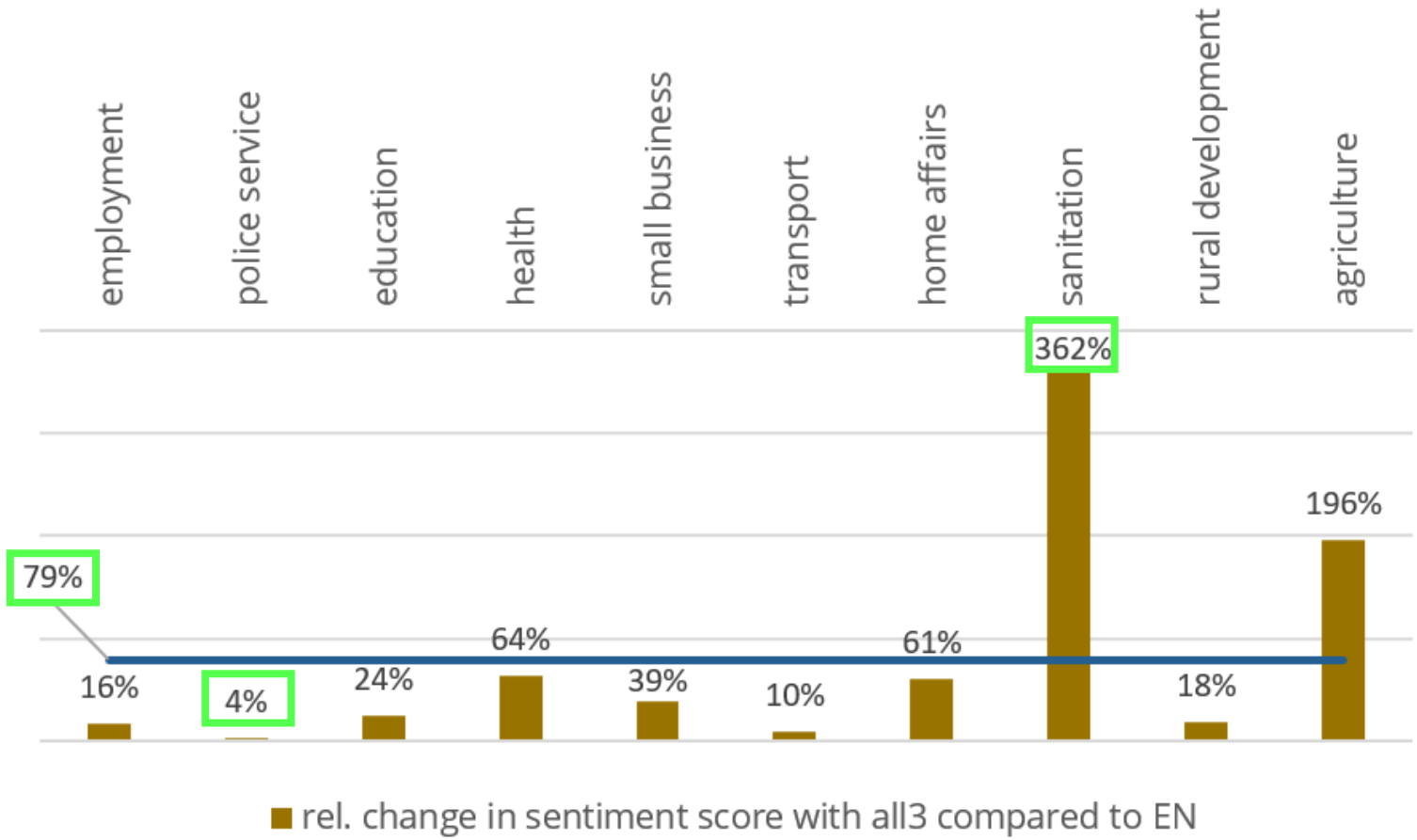
OVERALL SENTIMENT SCORE



DIFFERENT SCORES BETWEEN EN & ALL3

Image Sources: Mabokela & Schlippe (2022).

IMPORTANCE OF SEPEDI AND SETSWANA



DIFFERENT SCORES BETWEEN EN & ALL3

Image Source: Mabokela & Schlippe (2022).

SENTIMENT DISTRIBUTION OVER THE TOPICS

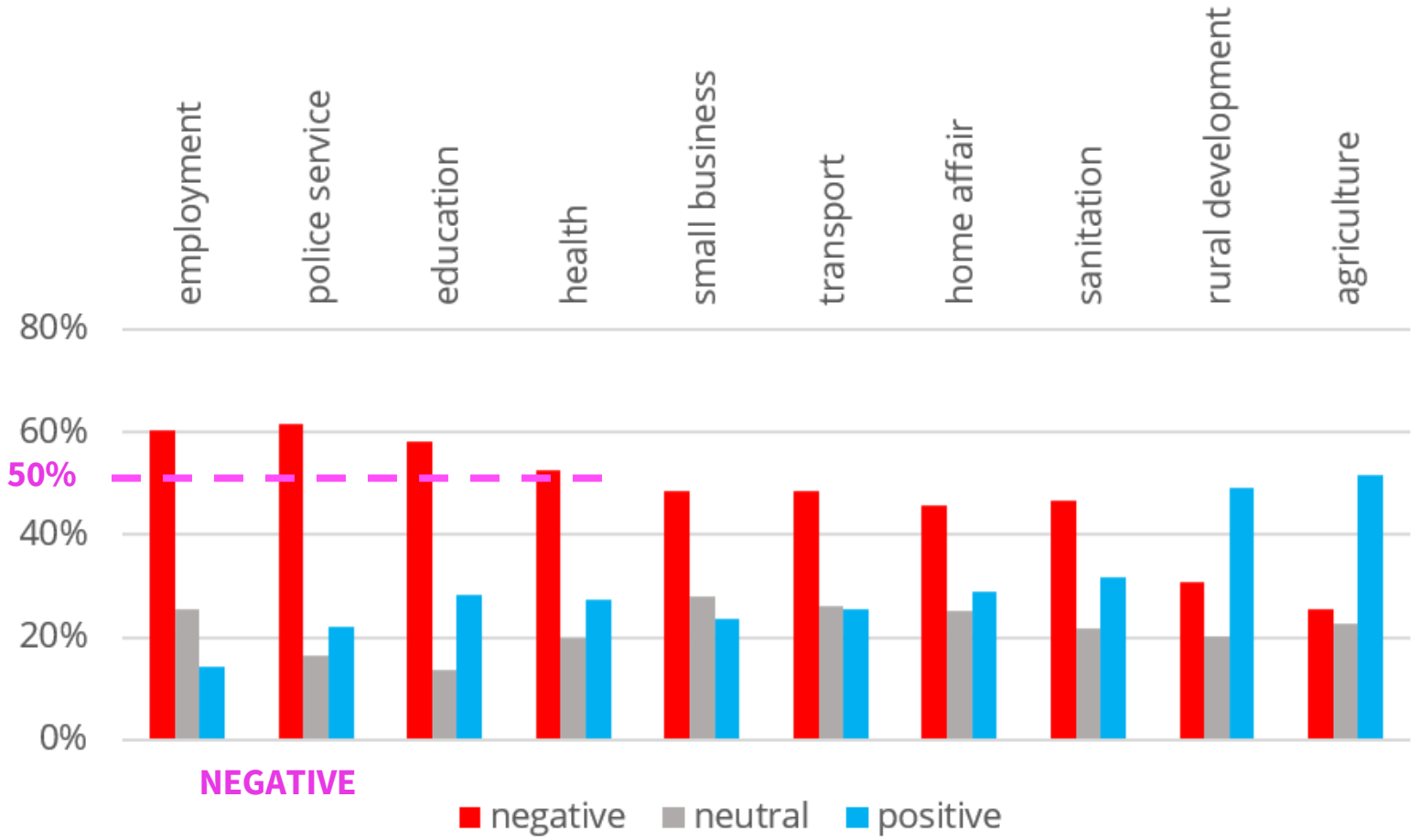
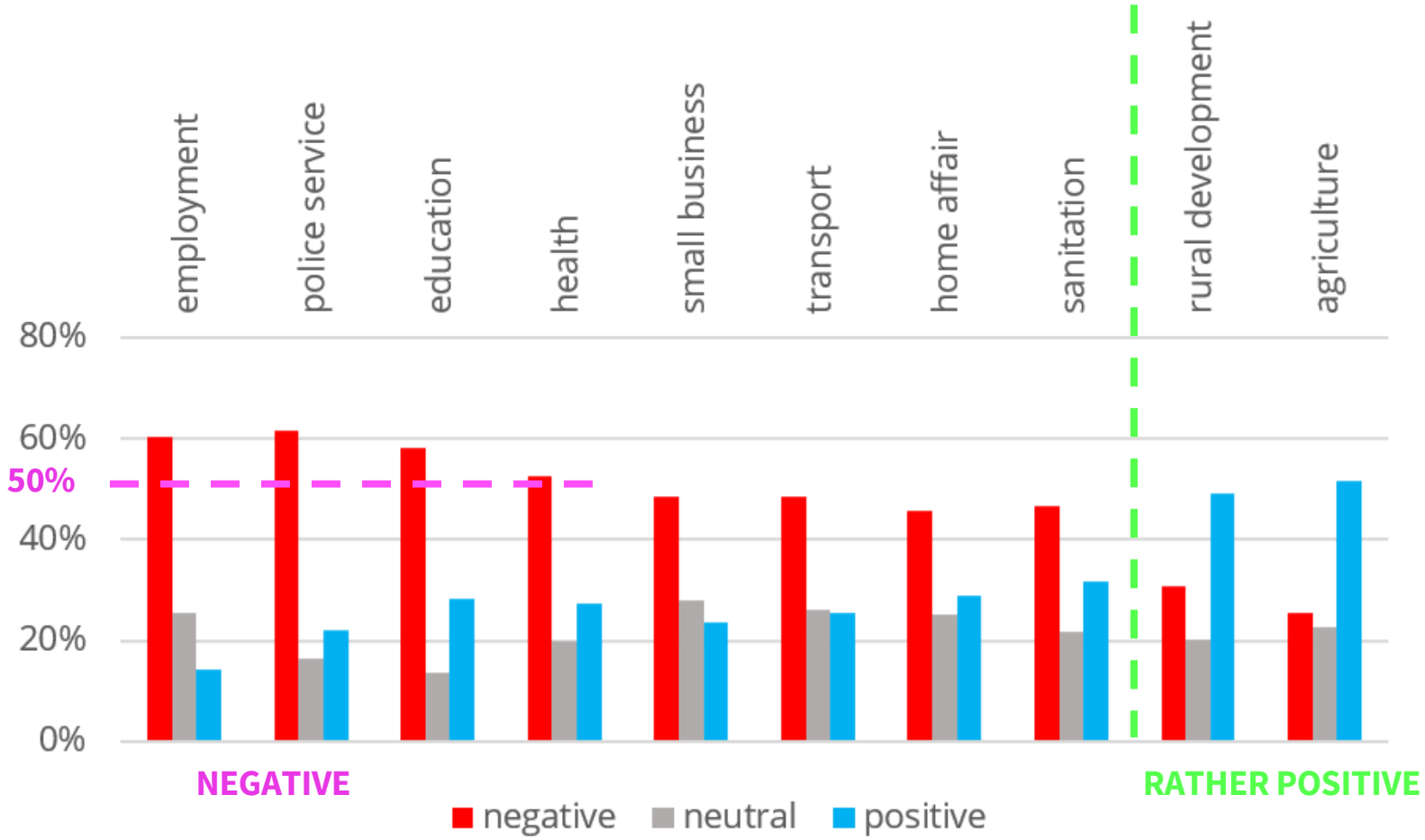


Image Source: Mabokela & Schlippe (2022).

SENTIMENT DISTRIBUTION OF THE TOPICS



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5

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CONCLUSION AND FUTURE WORK

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Furture Work

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- Add other features like the number of likes or the number of retweets

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THANK YOU

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Images

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