

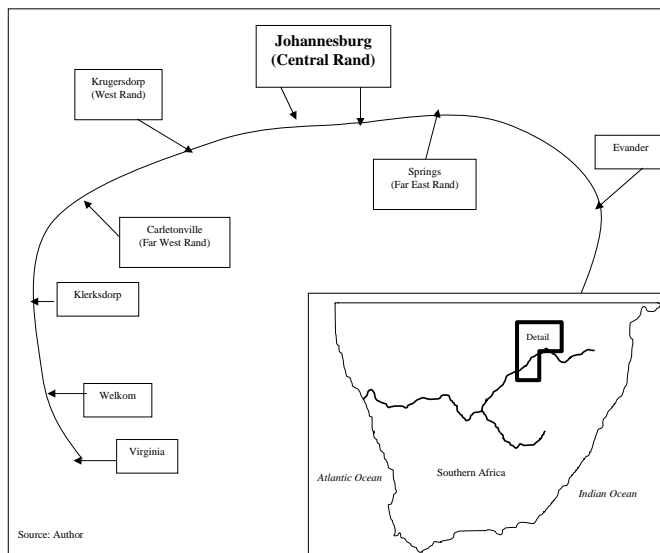
# The Evolution of Research Collaboration in South African Gold Mining: 1886 - 1933

## The Witwatersrand Basin

The Witwatersrand Basin is an ancient inland sea around 3 billion years old and roughly 350km long by 150km wide

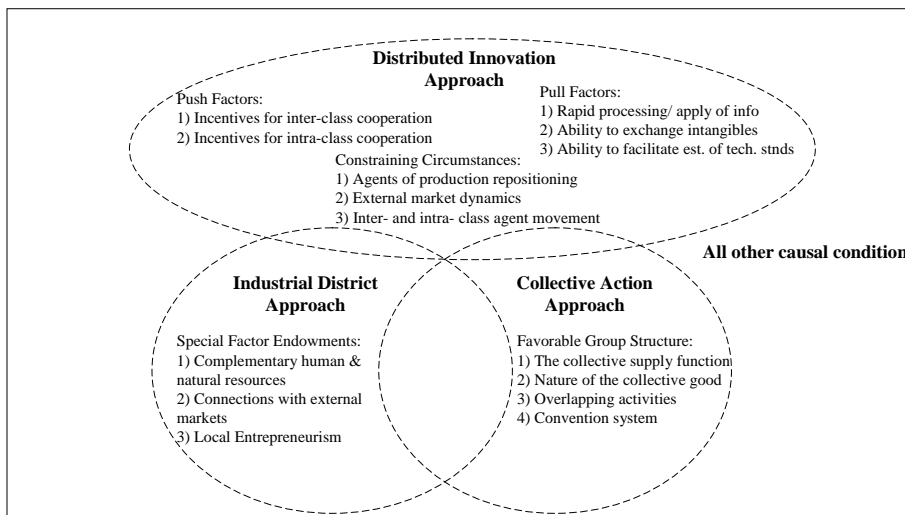
Most of the basin is covered by younger rocks of considerable depth, but tectonics exposed the northern edge

On that edge, in a region known as the Central Rand mining of the Witwatersrand Basin began



# Part One: Analytical Approach to Collaborative Research

## Analytical Approaches' Causal Conditions



# Part Two: The Cyanide Method of Gold Extraction

## The Cyanide Method of Gold Extraction

Gold is deposited with other minerals in host rock that requires metallurgy to separate

Initially, naturally oxidized gold bearing deposits were crushed and passed over mercury plates with gold sinking into mercury

At greater depth, gold bearing host rock not oxidized and so mercury based extraction ineffective



# Part Three: Changing Stopping Practices

## Changing Stopping Practices

Stopping practices are underground operations removing the gold bearing host rock (reef)

Underground mining uses horizontal tunnels dug from vertical shafts to access and transport the reef

The actual work area where the reef is extracted is called the stope

Stopping involves:

- 1) Drilling small holes (blast holes) into the host rock
- 2) Planting and detonating explosives in these holes
- 3) Removing the blasted material and sending the reef for extraction



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## Changing Stopping Practices

Initially, stoping was done manually by Africans with hammers and chisels under the supervision of expatriate miners

With metallurgy requiring greater through-put and increasing depths requiring greater at work efficiency, rock-drills replaced hammers and chisels



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