

An Investigation into the Drivers and Barriers to Implementing Green Building Features and Initiatives (GBFIs) in South Africa's Private Residential Housing Sector

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Background

Resource consumption and energy crisis

Role of GBFIs in mitigating resource consumption and alleviating energy crisis

Private Residential Housing Sector

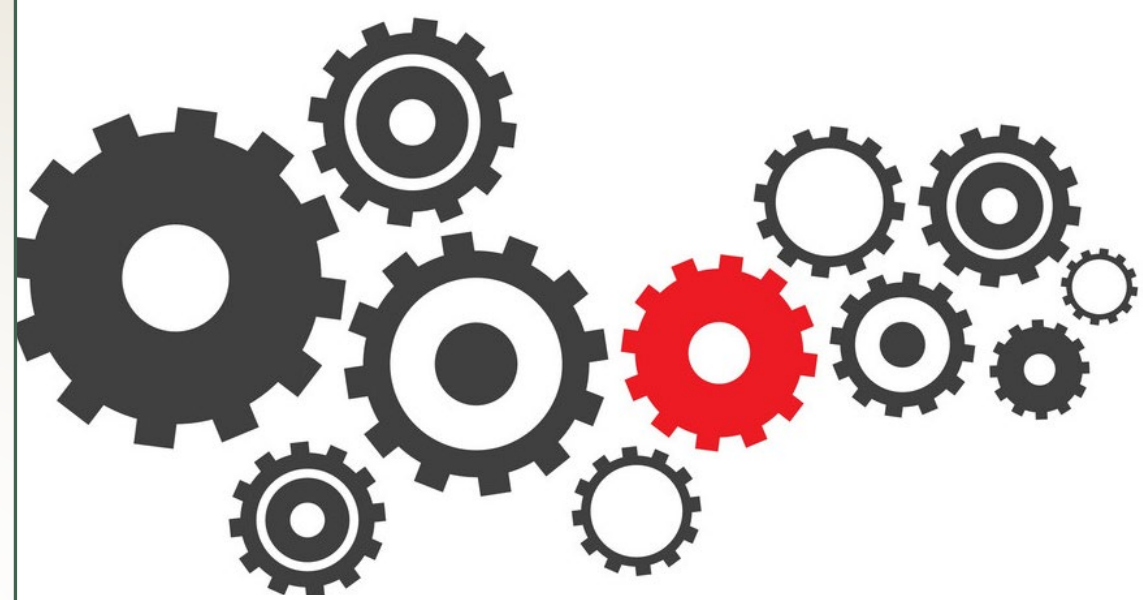
Drivers and Barriers to Implementing GBFIs



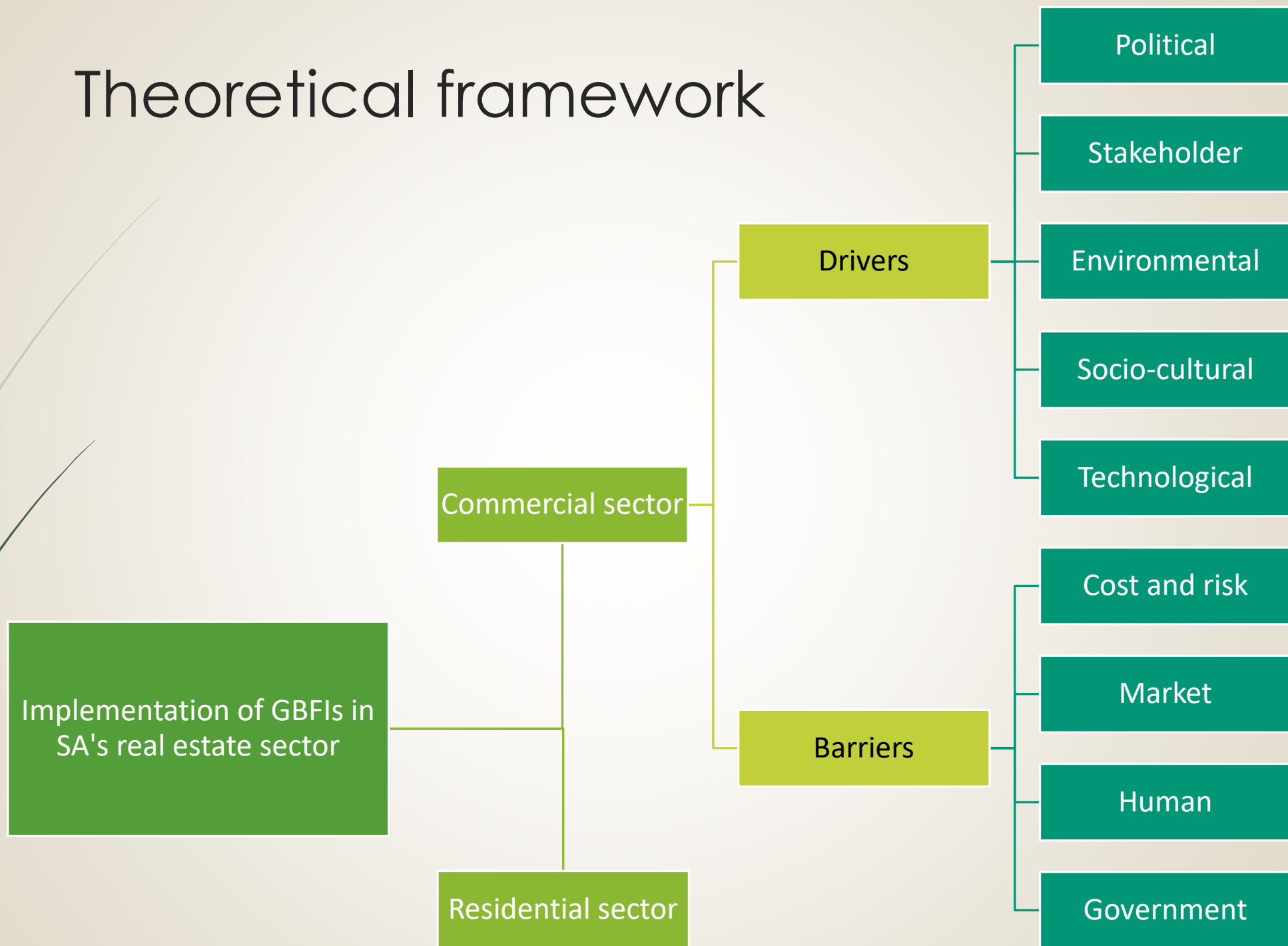
Research Proposition

There are governmental, human, and market-related barriers to the adoption of GBFIs in SA's private residential housing sector.

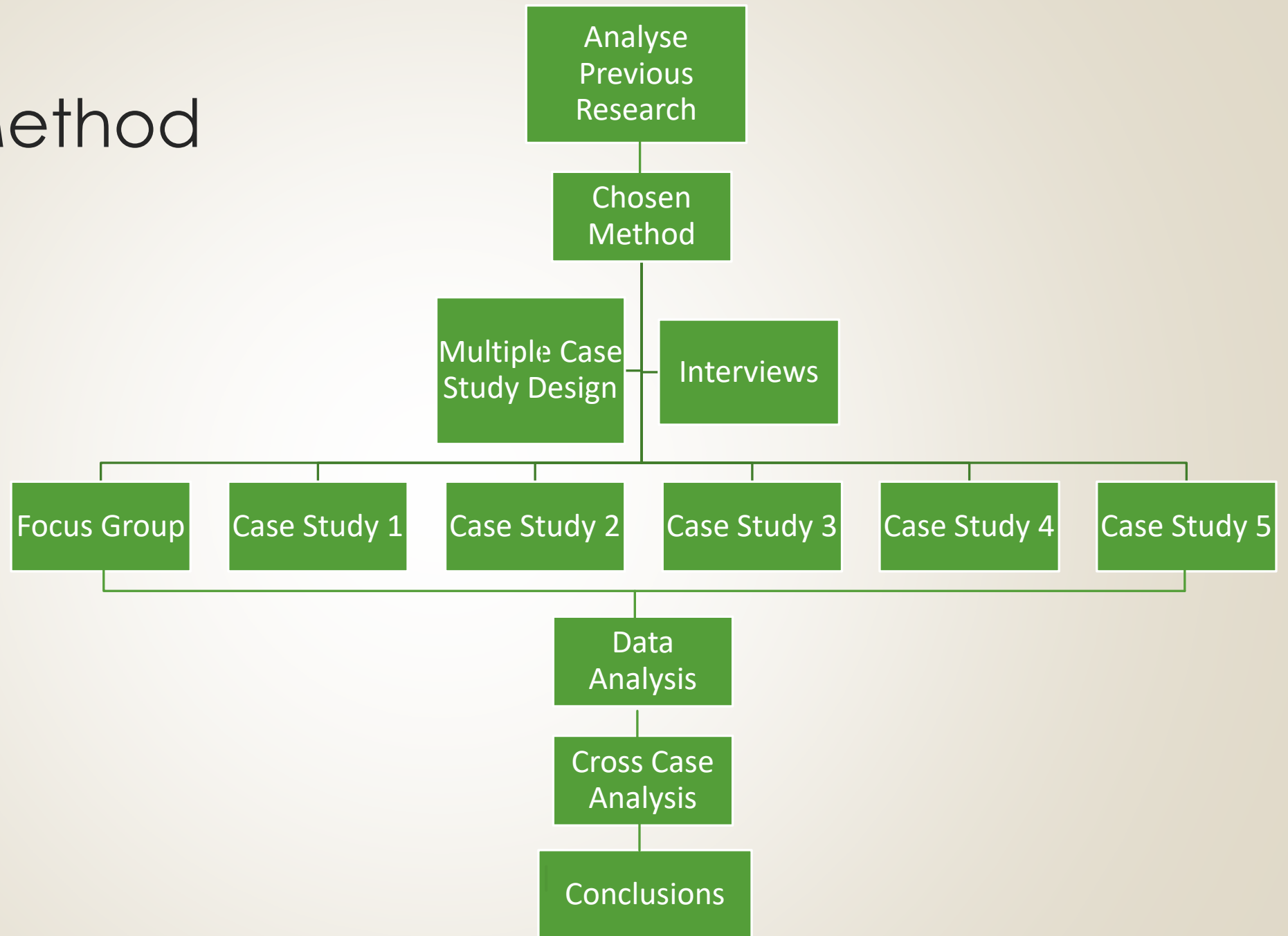
Socio-cultural, stakeholder, and environmental factors also drive the adoption of GBFIs in the private residential housing sector.



Theoretical framework



Method



Respondents

➤ Focus Group

MDE	Managing Director Energy
HDP	Head of Development Planning
SHEQ	Safety, Health, Environment and Quality Advisor
GAP	Green Accredited Professional
EH	Environmental Head

➤ Case Studies

CS1R1	Case study 1 Respondent 1
CS2R1	Case study 2 Respondent 1
CS3R1	Case study 3 Respondent 1
CS4R1	Case study 4 Respondent 1
CS5R1	Case study 5 Respondent 1

Focus Group



The developer is one of the largest sectional title property developers in SA; listed on the JSE.



Focus: design, construct, and sell eco-friendly sectional title residential units in the Western Cape, Gauteng, and KwaZulu-Natal.



Focus Group: respondents directly involved in the private residential developments of the 5 case studies located in Pretoria, Midrand, Johannesburg, and Cape Town.



Case Study respondents: Respective site managers of the case study developments.



Case Study 1



Overview

- Residential development located in Pretoria East (City of Tshwane Metropolitan Municipality, Gauteng province).
- Over 1900 units: one-, two- and three-bedroom apartments; plans for further development.
- Energy mix: Solar PV, electricity from municipal supply and diesel-powered backup generator.
- Rainwater harvesting systems and boreholes to address water costs and availability.
- Lifestyle centre uses solar PV and rainwater harvesting system.

Certification

- Residential units are EDGE-certified: using energy-efficient appliances, water-saving fixtures and construction materials with low-carbon embodied energy.
- Lifestyle centre: Six-Star Green Star SA rating, Net-Zero Carbon emission standard, certified by the GBCSA.



Case Study 2



Overview

- Residential development located in Midrand (City of Johannesburg Metropolitan Municipality, Gauteng Province).
- Over 900 units: one-, two- and three-bedroom apartments; plans for further development.
- Energy mix: Solar PV, electricity from municipal supply and diesel-powered backup generator.
- Lifestyle centre with energy saving appliances; half of electricity requirements provided by solar PV system.

Certification

- Residential units are EDGE-certified: providing 20% savings in energy, water, and embodied energy in the materials used.
- Lifestyle centre: Six-Star Green Star SA rating, Net-Zero Carbon emission standard, certified by the GBCSA.



Case Study 3

Overview

- Residential development located in Midrand (City of Johannesburg Metropolitan Municipality, Gauteng Province).
- Over 1030 units: one-, two- and three-bedroom apartments; plans for further development.
- Energy mix: electricity from municipal supply, gas supply, and diesel-powered backup generator.
- Older development – no RE energy sources.

Certification

- No EDGE-certified units.

Case Study 4



Overview

- Eco-conscious residential development located in Johannesburg (City of Johannesburg Metropolitan Municipality, Gauteng Province).
- Over 1900 units: one-, two- and three-bedroom apartments; plans to develop green eco-bridge for wildlife corridor.
- Energy mix: Solar PV, electricity from municipal supply and diesel-powered backup generator servicing security features.
- Lifestyle centre with solar PV panels supplying half of energy demand; rainwater harvesting tanks providing irrigation water.

Certification

- Residential units are EDGE-certified: energy-efficient appliances, water-saving fixtures, and construction materials that use low-carbon embodied energy.
- Lifestyle centre: Six-Star Green Star SA rating, Net-Zero Carbon emission standard, certified by the GBCSA.



Case Study 5



Overview

- Residential development located in Cape Town (City of Cape Town Metropolitan Municipality, Western Cape Province).
- Over 1000 units: one-, two- and three-bedroom apartments; more under construction.
- Energy mix: Solar PV (provided at 10% discount to residents), electricity from municipal supply and diesel-powered backup generator servicing security features.
- Energy-efficient fittings in the residential units and communal spaces; using construction material with less embodied carbon.
- Wastewater is recycled and used for flushing toilets.

Certification

- Residential units are EDGE-certified: energy-efficient appliances, water-saving fixtures, and construction materials that use low-carbon embodied energy.
- Lifestyle centre: Six-Star Green Star SA rating, Net-Zero Carbon emission standard, certified by the GBCSA.



Cross-Case Analysis

Drivers & barriers to implementation of GBFs in private housing sector

	Drivers			Barriers			
	Enhanced standard of living	Increased awareness	Incentives by financial institutions	Lack of education	High costs relating to energy	Municipal involvement	RE green building regulations
FG	All case study developments provide enhanced living standards via integrated design and living	Increased awareness of green buildings promotes unit uptake by first-time homeowners	Incentives by financial institutions aid uptake of EDGE certified developments	Construction practitioners lack education regarding green building principles and practices	High cost of RE generation impacts energy and water efficiency	Lack of adequate Municipal involvement hinders progress	GB regulations regarding RE generation in private developments are unclear and open to interpretation
CS1	Enhanced living standard not dominant; key aim is to satisfy residents' energy needs to promote green developments	High market demand from first-time homeowners knowledgeable about sustainability	Little information about the impact of financial institution incentives on green building uptake	Little information about education levels of construction practitioners regarding green building practices	High cost of RE generation limits implementation	Municipal involvement levels not significantly addressed	Impact of GB regulations not significantly addressed

Cross-Case Analysis

Drivers & barriers to implementation of GBFIs in private housing sector

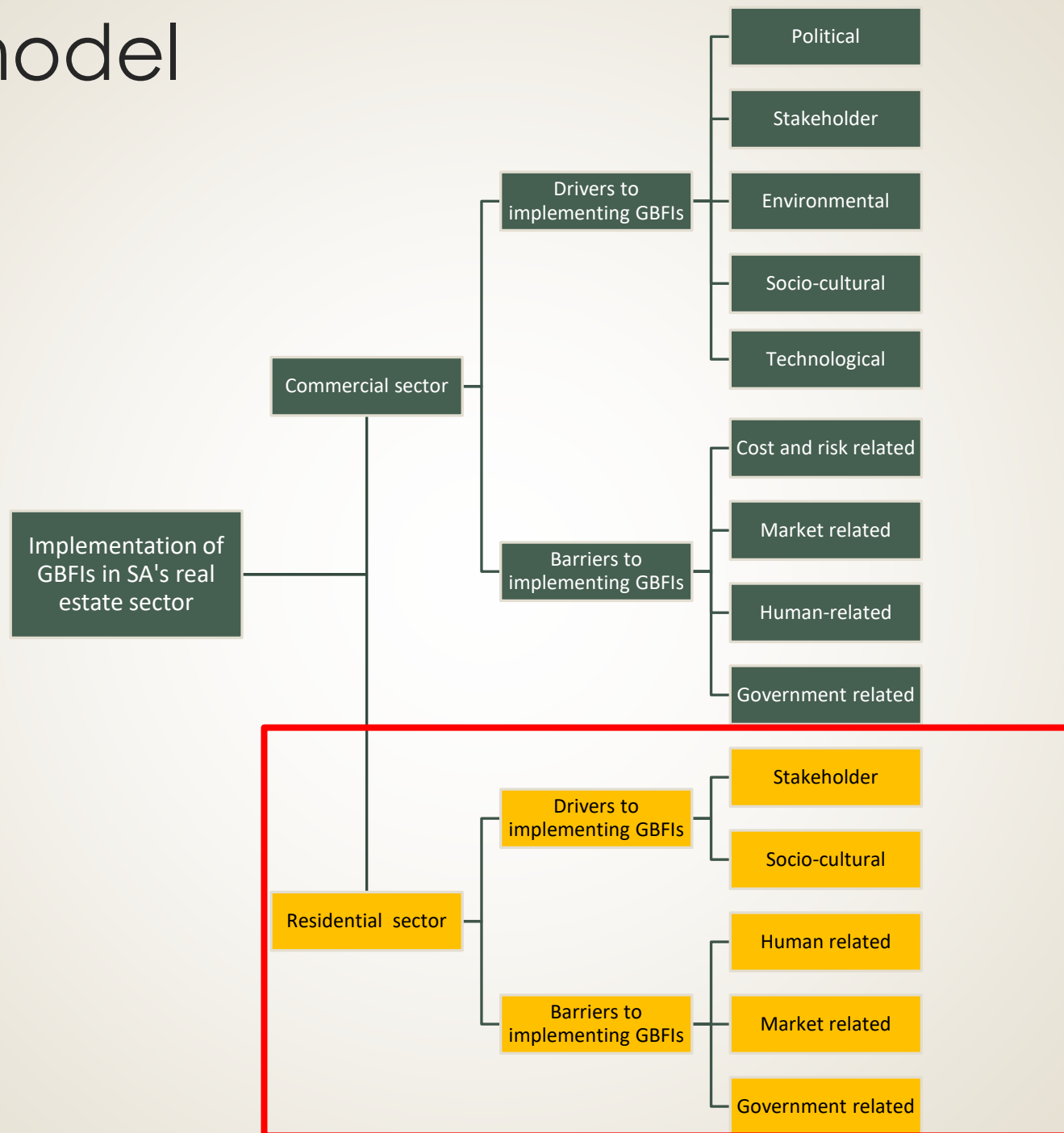
	Drivers			Barriers			
	Enhanced standard of living	Increased awareness	Incentives by financial institutions	Lack of education	High costs relating to energy	Municipal involvement	RE green building regulations
CS2	Emphasis on providing reliable power supply during loadshedding	Green building market demand not sufficiently addressed	Little information on the impact of incentives on green building uptake	General knowledge on green features implemented.	Cost of green technology is manageable	Limited municipal support with water treatment plants and infrastructure for energy wheeling	Impact of GB regulations not significantly addressed.
CS3		Green building market not addressed as a factor in implementing GBFIs	No information on the impact of incentives on green building uptake	Little knowledge of green building features and initiatives implemented.	Cost of incorporating green technologies prohibitive at the time	Municipal involvement not mentioned	Impact of GB regulation not addressed

Cross-Case Analysis

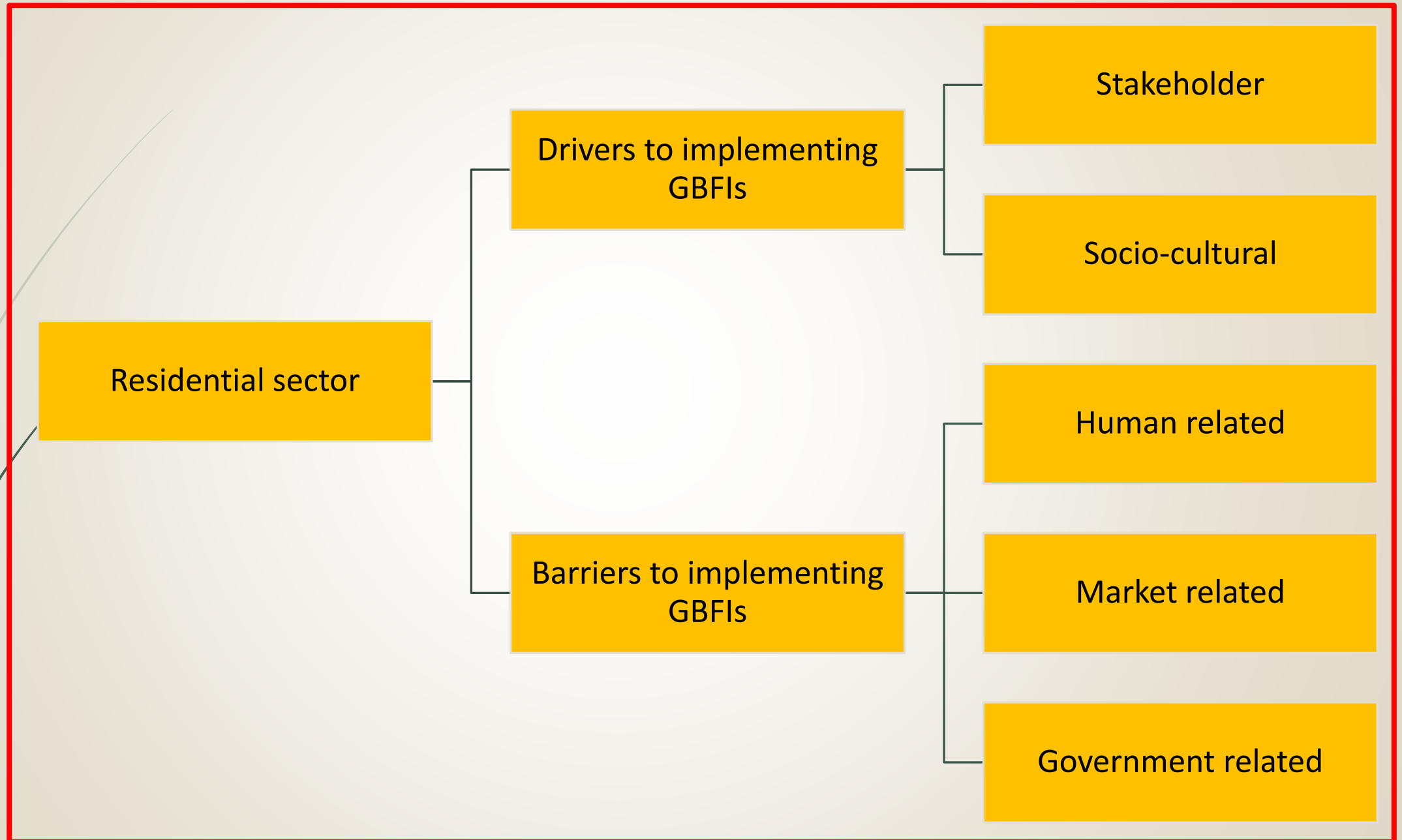
Drivers & barriers to implementation of GBFIs in private housing sector

	Drivers			Barriers			
	Enhanced standard of living	Increased awareness	Incentives by financial institutions	Lack of education	High costs relating to energy	Municipal involvement	RE green building regulations
CS4	Ongoing community engagement to enhance living experience via sustainable design	Market demand for green housing important driver in the uptake of units by prospective property buyers	Little information about the impact of financial institution incentives on green building uptake	Knowledgeable on concepts of green features and initiatives; analysing energy and water efficiency	Cost of green technology is manageable but cannot reach the energy efficiencies required	Municipality has been slow with approval of water recycling plants	Impact of GB regulations not significantly addressed
CS5	Medium emphasis on regard for enhanced standard of living as a driver	High market demand from all age groups for green sustainable buildings	Incentives by financial institutions accessible to prospective owners	Knowledgeable on concepts surrounding GBFIs employed in the development	High costs regarding energy wheeling	Municipality slow with stimulating growth of infrastructure to service the development	SANS 10400XA is a guideline but does not provide clear guidelines

Empirical model



Empirical model



Conclusions

Barriers to GBFIs

- Major barriers: lack of education on green building principles, high financial costs, inadequate building regulations, and lack of municipal support.
- Lower-level barriers: state of infrastructure, unique environmental conditions, and quality of green technology.
- Government support and clearer requirements are crucial for implementing RE and achieving EDGE certification.

Drivers of GBFIs

- Primary drivers: enhanced living standards, and awareness of green buildings.
- Low-level driver: Bank incentives – indicating a need for more financial institution involvement.
- Increased awareness of green building principles and practices essential to encourage investment in green developments.

Support of the Research Proposition

There are governmental, human, and market-related barriers to the adoption of GBFIs in SA's private residential housing sector. There further exists, socio-cultural drivers, stakeholder drivers, and environmental factors, that serve as drivers to the adoption of GBFIs in the private residential housing sector.

Thank you

