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Preface

The mining industry in Zambia has been and will continue being the cornerstone of the country's economic and social development. It is a well known fact the economic development and social transformation of any nation is dependent upon the investment made in education and especially tertiary education. It is also a well established fact that the setting up of the School of Mines in 1973 was aimed at developing human resources that the mining industry in Zambia at the time critically needed. This has not changed today. In fact, the growth and expansion of the mining industry has created even more pressure in that the demand for skills has outstripped supply not only at tertiary level but also at lower levels. This has been made worse by lack of investment in infrastructure development at the University of Zambia. The 2013-2017 UNZA Strategic Plan provides the general guide in terms of infrastructure development while this strategic plan, taken out of the main UNZA strategic plan, is intended to provide direction in revitalizing the School of Mines infrastructure and quality of education and research.

This strategic plan has been developed with the assistance of First Quantum Minerals Plc through hiring of a consultant, Deloitte and Touche. I, on behalf of the School of Mines staff and indeed my own behalf, wish to take this opportunity to thank most sincerely. This is an example of how collaboration between academia and industry is expected to work. As a School we look forward to building on this collaboration in order to improve on the quality of our graduates through improved teaching and research infrastructure and enhanced research and development.

Dr. Osbert N. Sikazwe

Dean

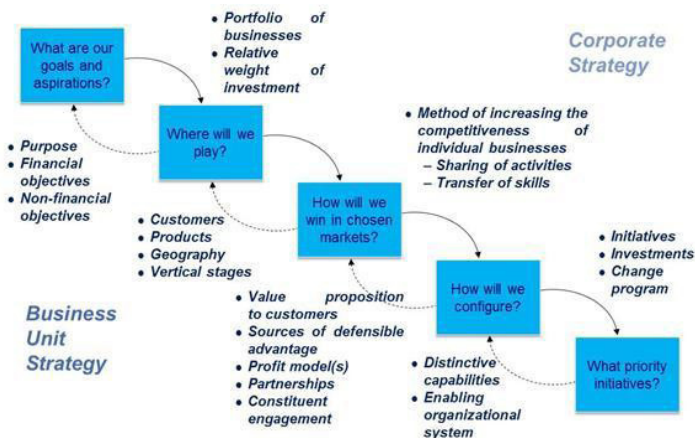
2. Purpose, Background and Approach

This document represents the detailed strategic plan for the University of Zambia’s School of Mines. It has been assembled through the analysis of the School of Mines’ current situation, creation of the joint vision for the future and underpinned from a joint commitment by the leadership of the School of Mines to undertake the key actions needed to achieve the vision set out by the leadership of the School of Mines.

The strategy has been shaped under the auspices of the broader 2013 – 2017 Strategic Plan established by the University of Zambia. The action items and timeline are organised along with the 10 Strategic Priorities set by the University.

The following strategy has been developed by the leadership of the University of Zambia School of Mines through the facilitation of the Deloitte Zambia Advisory practice, supported by First Quantum and Deloitte.

The approach used has applied the MonitorDeloitte strategic cascade method for assembling the core elements of the strategy and the Deloitte Change Journey team facilitation technique has been applied to provide the School of Mines leadership the space to form as a more cohesive team ready to drive the strategy.



3. Vision & Frame of Reference

The Vision

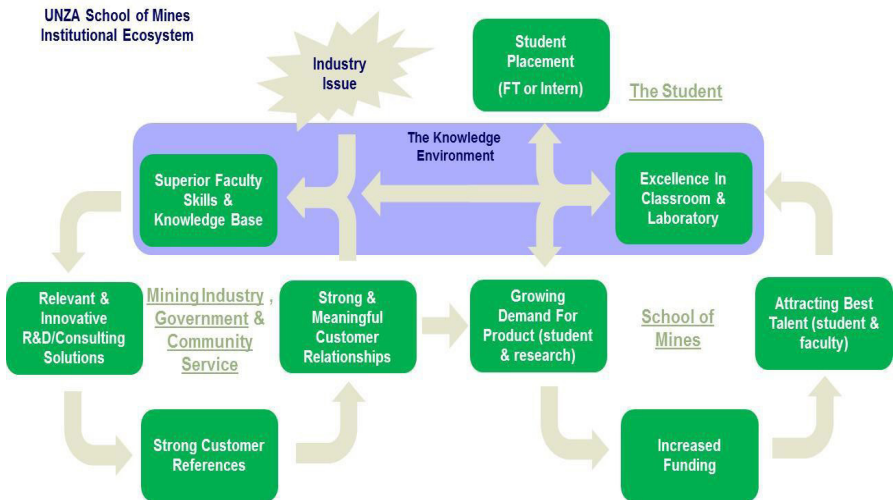
The School of Mines leadership has developed a compelling vision of the future which is underpinned by the establishment of a vibrant research and development pipeline which supports the overall student experience.

The Vision is:

“The UNZA School of Mines will be an integral partner in driving a globally competitive Zambian mining industry that makes the biggest possible contribution to Zambia and its people”.

Frame of Reference

To make this vision a reality, the leadership of The School of Mines has agreed to drive a programme of activity where it will improve performance in each of the key areas of all key parts of the UNZA School of Mines ‘Institutional Ecosystem’ identified below:



Each part of the ecosystem is interrelated and assuming solid performance in each area, will lead to the achievement of the vision.

Definitions and principles of the model

To further establish the model each area is grouped into three key sections. These are The Student, The Mining Industry, Government & Community Service and The School of Mines itself. In this section, the principle operating flow of the model is also described.

The Student

Student Placement – Placement of each student in relevant industry roles which will form a meaningful part of the student's career, enhance the performance of the mining industry and establish a positive alumni cohort within the Zambian mining sector. Roles can be full time or can be internship roles performed during the student's coursework at UNZA.

School of Mines

Classroom & Laboratory – The classroom and laboratory environment where students learn and apply the technical, financial, economic, social and environmental principles of the industry.

Demand of the Product (student & research) – The product of the School of Mines is students and research/consultancy which can be beneficial to the industry. The demand for this product would be established from the school's customer which are companies, governments and communities.

Funding – Research grants, scholarships, tuition, etc.

Talent (Student & Faculty) – The quality of student as they enter into the university and the quality and qualification of the School of Mines faculty.

Mining Industry, Government & Community Service

Faculty Skills & Knowledge Base – The core skill and knowledge base of the faculty in terms of their technical and domain knowledge around the subjects of the mining industry, mineral

economics, mining engineering, geology, hydrology, metallurgy and environment.

Research and Development and Consulting Solutions – The capacity to deliver research and consulting solutions which improve the performance of industry, government or enhance the livelihoods of communities.

Customer References – The act of a research or consulting customer providing a reference for a completed project.

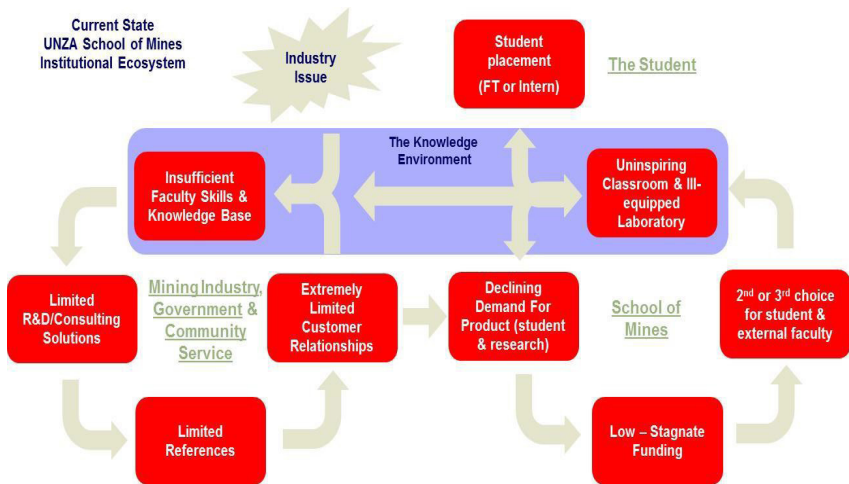
Customer Relationships – The professional relationship base in terms of industry, government and community stakeholders held by the leadership and faculty of the School of Mines.

Key Principle of the Model

The following outlines the main principle of this model for the School of Mines institutional ecosystem: The objective of producing excellent students which have a relevant qualification to industry, government or society and are able to apply that qualification in a meaningful role in those institutions. Excellent students are developed by the university education system through their active participation in a curriculum of learned principles applied through experience such as laboratory work or short term work placement. The faculty and university provide the environment for the principles to be learned and applied. The laboratory and work experience is fuelled by a joint relationship between the faculty, industry, government and communities where the faculty are able to conduct research and/or consulting work which benefits these key stakeholders in terms of addressing current issues and also driving innovation. A vibrant research and/or consultancy environment allows for the funding of state of the art laboratory equipment and the innovation of new equipment and techniques which support stakeholders. The student's participation research and consultancy allows for the real time application of key principles taught in the classroom, completing the institutional learning cycle and best readies the student for a productive start to his/her career.

4. Current State

At present, the current flow of activity within the institutional ecosystem is not functioning in an integrated manor at the School of Mines. The following performance notes for each area were developed through observation and interviews with the School of Mines leadership team and have been verified through workshops:



The observed condition of each core area relevant to industry/government or the school itself indicates a step change is necessary to arrest the school from the current situation

The Student

Student Placement FT or Intern

- Students are being placed but are seen by industry to not have the relevant applied experience when compared to graduates from other institutions. The gap in applied learning is measured to be between 2 and 3 years.

School of Mines

Demand for Product (Student & Research)

- The core 'offer' of expert services from the school is not articulated in a focused way as to compel the mining industry or government to fund research

Funding

- Funded research is extremely low and susceptible to decline

Quality of Student & Faculty

- It is believed students make School of Mines a second choice
- Fresh faculty have been difficulty to recruit forcing retired professors to return

Quality of Classroom & Laboratory

- Classrooms and laboratories are not currently with equipment of the time for teaching or research purposes
- Professor truancy is often mentioned as an issue

Mining Industry, Government & Community Service

Faculty Skills & Knowledge Base

- Faculty is experience, through has not been researching innovating techniques for a material period of time

Number of R&D/ Consulting Projects

- Research & development and consulting projects exist, however, the project do not hit at the core interests of industry and are often outside of the interests of the country

Number of referenceable projects

- Negligible client references

Number of Profitable Customer Relations

- Extremely limited number of 'profitable' relationships with industry. Those that do exist are not held with core set of mining companies

Potential Root Cause

It is important to first understand the history and root cause to the Current Reality as it highlights opportunities for step change improvement which will be key to unlocking the potential of the institution.

As the commercial environment of mining in Zambia has shifted from state owned (up to 1995) to privatization of the mining enterprises with a minority equity stake held through ZCCM-IH, the UNZA School of Mines has not shifted their approach to the Zambian mining industry accordingly.

Taking the framework that a vibrant, well respected and competitive educational institution ascends to superior position in the minds of students, industry (employers and customers of research) and government by leading innovative applied learnings through relevant research, passing that on to improve industry and equally delivers an outstanding learning experience for students, the educational institution will thrive.

At the root of the current reality is the main stakeholder group which represents the mining industry has broadened from members of the state to include multinational mining companies; with the multinational mining companies being the only stakeholder materially capable of funding innovative research and hiring grads from the School of Mines.

During the time national operation of the mines by ZCCM, the school experienced a steady stream of recruiting activity from ZCCM for students in both full time and summer internship roles, research grants from ZCCM were easy to come by and consulting work for the professors was also reasonably abundant. The relationship between ZCCM and the school was strong and fostered by the government and national ownership and operation of the mine.

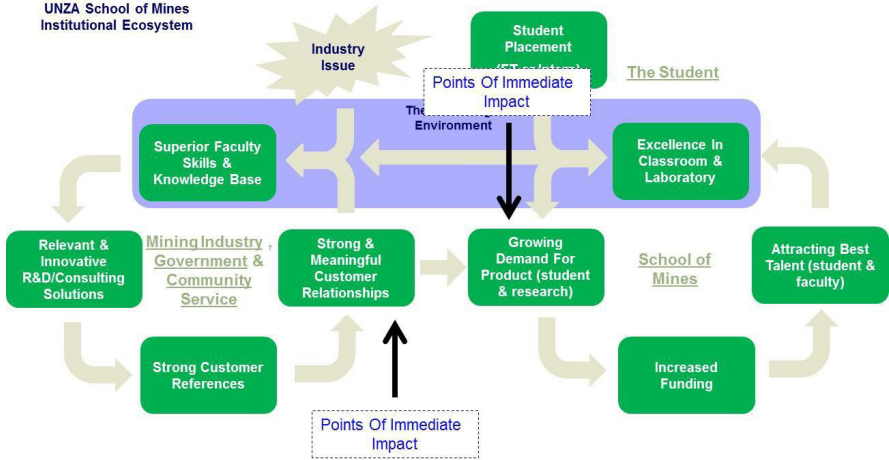
Through privatization, which commenced 1995 and picked up pace through the early 2000's, the role and influence of ZCCM

shifted to that of a holding company, moving it away from being able to materially fund activity at the school. Whether the faculty of the school tried to shift their relationship to the mining companies in the early days of this transition or not has not been established, however, it is the case that as mining companies have established operations and brought copper production back up to respectable levels from an output, profit and safety perspective the school has not built effective and mutually beneficial relationships with the heads and senior management of the mining operations/ companies in Zambia. This is evidenced by the fact that the Dean of the UNZA School of Mines and the Heads of Department are able to articulate only a handful of relationships they hold with the CEOs or Senior Local Management of First Quantum, Barrick Resources, Mopani, KCM, Vale or Kagem combined.

The erosion in relationship has thus constricted the flow of research and consulting monies into the school, thus freezing the innovative capacity of the school which in turn has reduced the educational experience for the students leaving graduates and interns much less experienced in more up to date practical applications of the matters of mining, geology and metallurgy. Infrastructure improvements to research equipment and laboratories have virtually stopped, leaving the institution unable to compete for new research or consulting due to a lack of basic facilities and experience.

Suggested Immediate Actions

There are many actions needed to advance the School of Mines' position. These actions are captured as part of the The Strategy outlined in the next section. Two main points of immediate impact stand out from a review of the root cause, however. These two points are Creating Meaningful Customer Relationships by re-establishing relationships with mining companies, government and key community stakeholders as a first action and secondly Growing Demand for the Product (student & research) by setting the core 'offer' of the product which provides clarity for stakeholders. These two improvement areas are labelled as Points of Immediate Impact below.



5. The Strategy

Taking the ‘Strategic Cascade’ approach to establishing the final strategy, the School of Mines leadership have established the detailed strategy. The strategy was established through a series of workshops where the School of Mines leadership identified their current situation, established a vision for the future and identified how they would configure going forward to achieve the vision. This ‘Strategy Cascade’ establishes the school’s goals and aspirations as set out by the School of Mines Leadership. The Leadership Team has then driven a focus by establishing where the school will play in terms of customer and segment priority, identified how the team will be successful in these areas, noted how the team will configure and finally outlines the priority initiatives which will be undertaken to make the strategy a reality. These components are detailed below:

**The UNZA
School of Mines
Goals &
Aspirations**

Aligned with the UNZA vision to be “a provider of World class services in higher education and knowledge generation”, the leadership of the UNZA School of Mines has set the following vision:
“To be an integral partner in driving a globally competitive Zambian mining

industry that makes the biggest possible contribution to Zambia and its people”

This vision is underpinned by the following aspirations:

- To populate the Zambian mining industry with indigenous talent that is the best in the world and have a unique understanding of the nuances of the Zambian ore reserves and its mining and processing industry;
- To be the research partner of choice to mining companies operating in Zambia; and
- To be a thought partner to Government on all significant techno commercial issues in the mining industry.

Where The School of Mines Will Play

With the full knowledge that focus will create impact and deliver results, the leadership team will strive to:

- Attract the Zambian students who have the highest probability of becoming the best mining engineers, metallurgists, and geologists in the world;
- Establish a learning environment that is underpinned by a balanced classroom, laboratory, internship and research experience for all students;
- Provide selected research and consulting services to the mining industry in Zambia; and
- Provide thought leadership to Government on all technical and commercial mining related issues.

Where The School of Mines Will Play

To win the School of Mines will:

- Conduct research in subject matter which is important to the mining industry and society in effort to improve the safety, profitability and social contribution of the mining industry for the people of Zambia and investors;
- Understand in detail what the mining industry looks for when recruiting graduates and will tailor our delivery to produce graduates that meet this need;
- While still delivering a generic mining, metallurgical and geological competence, we will further develop a deep and unique knowledge of issues unique to the mining industry in Zambia. Initially playing to our 9 collective core strengths in Geology, Mining and Metallurgy which are:
 - **Geology** - Economic Geology & Petrology; Exploration Including Geochemistry, Geophysics & Mapping; Hydro & Engineering Geology
 - **Mining** – Underground Mining Operations Optimisation; Mine Environment & Ventilation; Underground & Surface Rock Mechanics
 - **Metallurgy** – Mineral Processing; Physical Metallurgy; Metallurgy In The Environment; and
- Engage actively with industry and government in effort to build meaningful relationships which will in turn provide opportunity for the School to conduct meaningful research and consultancy work

**Where The
School of Mines
Will Play**

To do this, the school will configure in the following way

- Focus all of our limited resources on the basics of a general mining, metallurgical and geological education, and on selected deep competencies that will differentiate us in Zambia. We will stop doing everything else;
- Will make sure that we have the faculty best suited to delivering on this strategy at all times;
- Will invest our money wisely in the basic facilities that are critical to delivering this strategy;
- Will enter into selected partnerships to deliver generic competencies that fall outside of this focus, where necessary; and
- Will partner with donors and universities where we have common interests.

**The School's
priority
initiative**

The priority initiatives for the school will first focus on re-establishing relationships with key stakeholders and clearly defining the core strengths of the school in form of the 'product offer'. From this base, the team can then build out on the other key initiatives which will drive the School of Mines Institutional Ecosystem to a higher level of performance. The key initiatives are:

1. Establish focused engagement time with major mining companies and government in effort to commence a balanced relationship development process with a focus on the strategy;
2. After clearly defining the 9 core strengths of the department and establishing an offer, engage with mining companies and government to explore opportunities where the school can conduct research or provide consultancy services;

3. Deliver high quality value added Research & Development or Consultancy Projects;
4. Place students in meaningful work or project experiences;
5. As funds begin to flow from initial research and consultancy, refurbish or replace critical lab equipment;
6. Establish research clusters to focus on issues that are interdisciplinary in nature; and
7. Establish the budget for the overall undertaking.

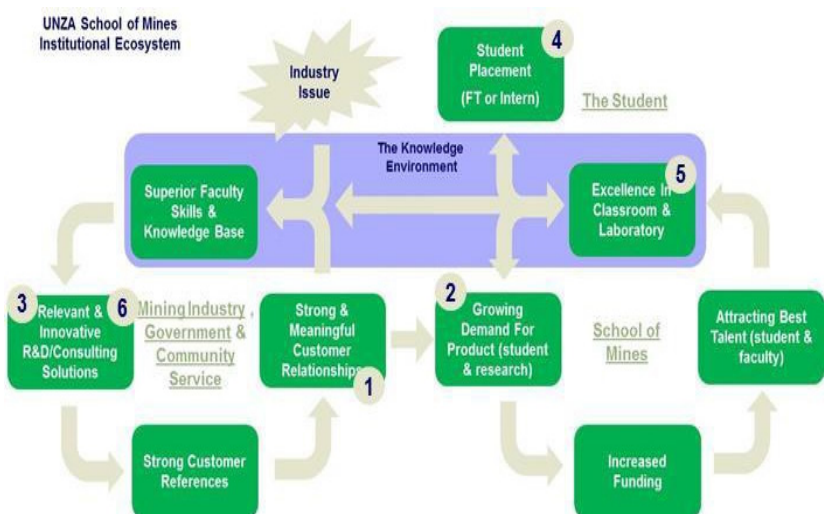
6. The Initiatives & Action Plans

In this section, the 7 initiatives are defined, put in context relative to the institutional ecosystem model and further delineated in terms of discrete actions needed to successfully complete each initiative. From the Strategy, the initiatives are labelled and further defined as follows:

1. **Rebuilding Relationships** - Focused relationship development through engagement of the major mining companies and government will 'jump start' the virtuous cycle driven by relationship growth fuelled from delivery of quality relevant research work;
2. **Establish The Core Offer** - School of Mines leadership has established the competency areas which sit at the core of the research and consultancy offer;
3. **Creating The Pipeline of Opportunity** - Delivering high quality value adding solutions to industry will establish credibility and will ultimately lead to more work. Maintaining an active pipeline of projects keeps the idea generation process going with industry and government;

4. **Student Placement** - Placement of students in meaningful internship and study work will enhance the educational experience and contribute to the meaningful development of relationships with industry & government;
5. **Focus On Upgrading Equipment** - Initial research work will need to be conducted using existing equipment, however, as relationship develops, there is a chance for each department to improve the asset base;
6. **Form Research Clusters** – Establish cross functional research clusters as research project requirements become more clear and the integration of skills and knowledge becomes more relevant; and
7. **Establish Budget** – Establish the budget for executing the action plan behind the strategy.

Relative to the School of Mines institutional ecosystem model, the impact of each initiative labelled right:



Priority Initiative Task List

1. Rebuilding Relationships	Who	Outcome	When
Form Industry Advisory Board and map key relationships	Dean of School of Mines	<ul style="list-style-type: none"> Advisory Board formed 	Board was formed in January 2014 and held its 1st meeting in April 2014
Set rebranding of School's Offer	Dean of School of Mines	<ul style="list-style-type: none"> Main message consolidated Department offers finalised 	15 th September 2014
Conduct Roadshows	Dean of School of Mines	<ul style="list-style-type: none"> Roadshows Scoped Team assembled Visit to each of the key stakeholders 	15 th October to 2014 15 th November 2014
Fully develop opportunity with First Quantum	Dean of School of Mines	<ul style="list-style-type: none"> Established relationship with the right people within FQML and identification of the first set of projects 	To be undertaken as part of roadshow

2. Core Offer	Who	Outcome	When
Establish the detailed offer in each department clearly stating Industry Issue, UNZA SoM point of view, solutions, faculty & staff expertise	HOD's Research Coordinators to work with the Assist. Dean Research and the HOD's	2. page statement per department	7th October 2014
Participate fully in roadshow process	Dean, Assistant Dean, HOD's	Meetings and workshops with stakeholders	15th October 2014 to 15th November 2014
Establish minimum requirements around funding needed to conduct first research project	Research Coordinators under the direction of Assist. Dean of Research	Requirements scoped and prioritised	14th December 2014 to 15th February 2015
Test through initial engagement	HOD's, Research Coordinators, Assistant Dean Research	Initiated first Project (Projects to be spread if more there is more one)	15th March 2015

3. Creating the Pipeline of Opportunity	Who	Outcome	When
Create brainstorm list of potential projects which each department can undertake based on clear understanding of industry issues and industry demands	Assistant Dean Research Research Coordinators HOD's	Project Portfolio and Pipeline brainstorm list set up	30th September 2014
Establish pipeline process for monitoring and tracking projects	Assistant Dean Research	Process and roles are designed and in place	15th September 2014
Focus on hypothesis development during the contact and discussion stages	Research Coordinator under the direction of Assistant Dean Research	Scoped Projects	15th December 2014 To 15th February 2015
Execute at least one project in each of the 9 core areas by the end of 2015	HOD's	9 completed projects (Each dept. to execute atleast 3 projects)	31st December 2015

4. Student Placement	Who	Outcome	When
Clearly document the current internship and study approach and set for all departments	Assistant Dean U/G working with HOD's	General Approach outlined using the Mining Departments current operating model (internship management approach) Inventory of current schedule	30th September 2014
Set engagement schedule with each relevant stakeholder at client. Should be conducted in concert with overall Roadshow process	Assistant Dean U/G working with HOD's	Engagement Schedule set Adopting the internship management approach	16th November 2014 to 31st December 2014
Establish a clear relationship basis with client owner of study/internship work seeking feedback	Assistant Dean U/G working with HOD's	All new internships are using the internship management process	15th January 2015
Identify future projects for internship or study with the idea of further developing R&D work	Assistant Dean U/G working with Assistant Dean Research and HOD's	As part of the project portfolio process	Ongoing

5. Focus On Upgrading Equipment	Who	Outcome	When
Establish detailed requirement and spec for equipment	HOD's working with other colleagues in the department	Focused list tied directly to research need	15th March 2015
Understand costs, delivery schedules, etc.	HOD's working with other colleagues in the department		In concert with scoping the research projects
Consider schedule of funding based on possible research pipeline	HOD's working with other colleagues in the department	Equipment delivery schedule	In concert with scoping the research projects

6. Form Research Clusters	Who	Outcome	When
Review potential project pipeline to identify how clusters might better support	Assistant Dean Research	Initial hypothesis on the application of research cluster	1st October 2014 to 1st December 2014
Establish research clusters based on market need	Assistant Dean Research	Scoped research cluster	15th May 2015
Conduct initial hypothesis development within each cluster	Assistant Dean Research	Updated portfolio's list	15th July 2015

7. Establish Budget	Who	Outcome	When
Complete initial action plan with resourcing and travel requirements	Dean of School of Mines	Roadshows scoped	22nd August 2015
Establish budget framework with initial estimates for undertaking the strategy	Dean of School of Mines	Budget framework established	23rd August 2014
Complete budget and socialise with Vice Chancellor	Dean of School of Mines	Budget socialised	25 August 2014
Final review of budget for approval	Dean of School of Mines	Budget reviewed	30 August 2014
Submit budget	Dr. Osbert Sikazwe	Budget submitted	30th August 2014

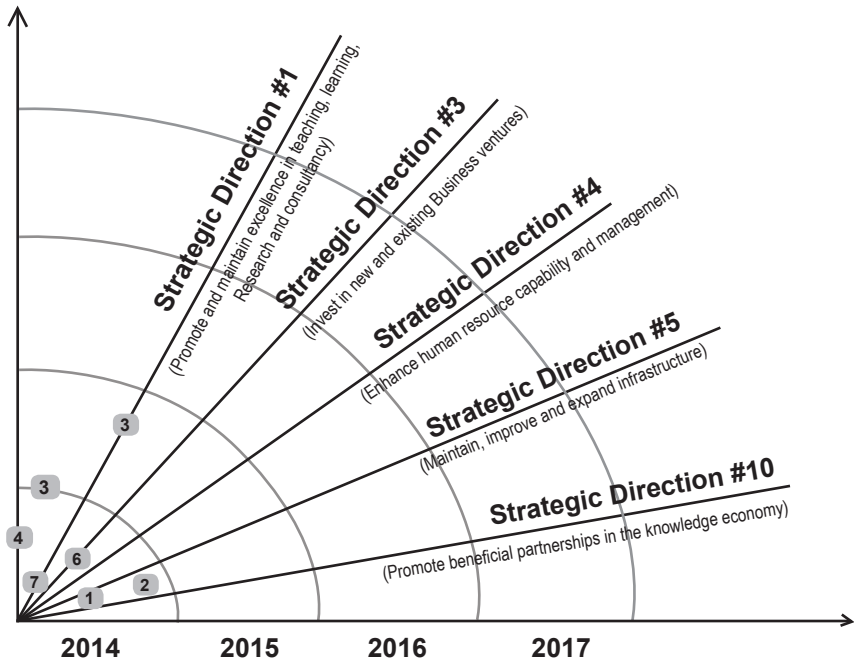
7. Alignment with the Broader Strategy and the Change Journey

Alignment with the Broader Strategy

The School of Mines Detailed Strategy aligns with the University of Zambia 2013-2017 Strategy. Though the initiatives from the strategy do not align with all of the Strategic Directions, the 6 main initiatives (establishing a budget being #7 which is important but not a core impact initiative) line up neatly under 5 of the Strategic Directions. This alignment with the 10 Strategic Directions is highlighted below:

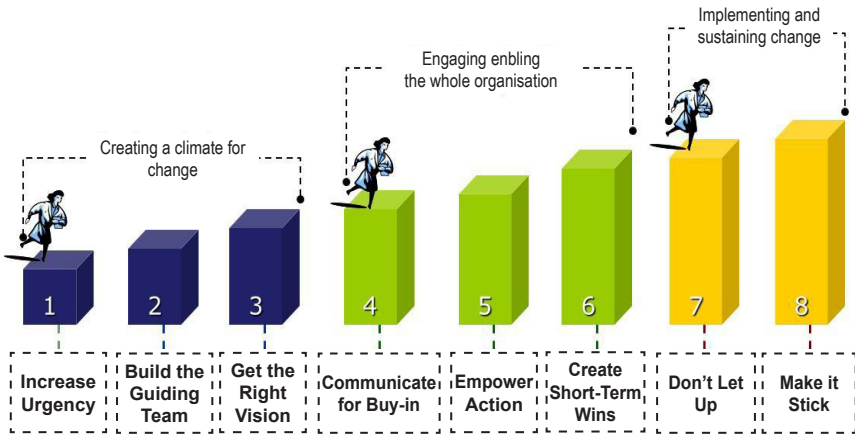
1. To promote and maintain excellence in teaching, learning, research and consultancy
2. Enhance financial and administrative management systems
3. Invest in new and existing business ventures
4. Enhance human capacity and management
5. Maintain, improve and expand infrastructure
6. Institutionalise Quality Assurance System
7. Expand and promote use of information and communication technologies across the campuses with the wider community
8. Provide open distance learning as an option for mass teaching, learning and research
9. Harness workers and allies energies for universities freedom from liability
10. Promote beneficial partnerships in the knowledge economy

Below the basic timing for each of the initiatives and alignment to each relevant strategic direction is captured:



The Change Journey

The change suggested by this strategy will be transformational for the School of Mines. Research by Kotter and Cohen and the industry experience of Deloitte suggest that careful planning and 'transformation management' will need to be undertaken in order to navigate the School of Mines through this improvement in effort to achieve the final vision. The framework below, established by Kotter and Cohen in their book "The Heart of Change" provides a reference for how the School of Mines Leadership and UNZA Leadership should approach this important agenda:



Applying this framework through the three major groupings of:

- Creating a climate for change;
- Energising and Enabling the whole organisation; and
- Implementing and sustaining change.

It is reasonable to place the School of Mines currently at the 'Creating a climate for change' stage. This is evidenced by the fact there is a vision, the Leadership team has formed and are energised about the journey ahead, and the anticipation of new success has created some urgency around the strategy. Further engagement with the University of Zambia senior leadership, key industry, government and community stakeholders to the institution, faculty and students now needs to take place in order to validate the strategy in effort to communicate for buy-in. The planned roadshows highlighted in Initiative #1 will go a long way to helping achieve this.

Once the buy-in has been successfully achieved the School of Mines will have established a very solid platform for progressing the other initiatives and will have greatly increased the likelihood of achieving the overall vision.