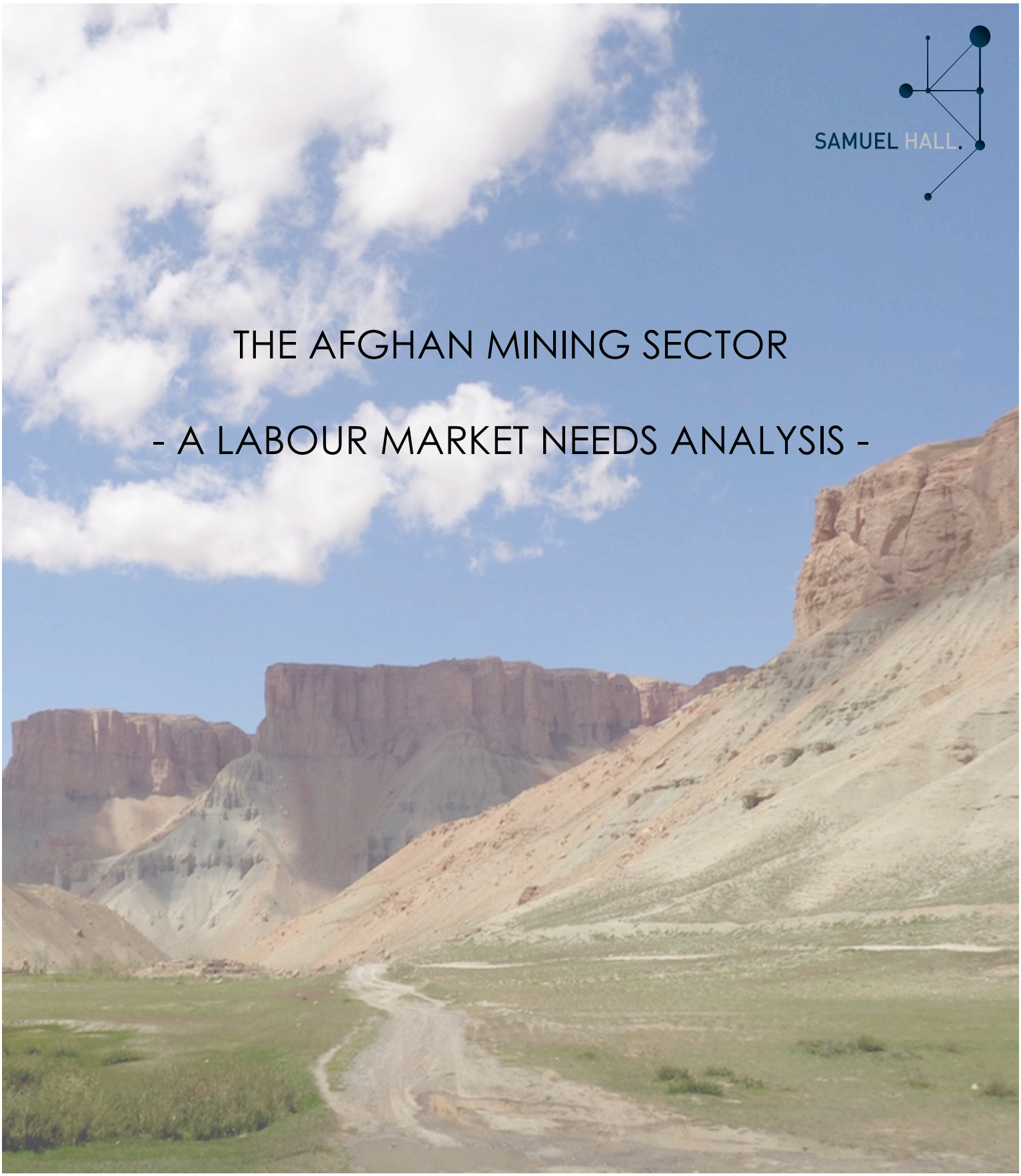

SAMUEL HALL.

THE AFGHAN MINING SECTOR

- A LABOUR MARKET NEEDS ANALYSIS -

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

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Abbreviations

ACCI	Afghanistan Chamber of Commerce and Industries
AEITI	Afghan Extractive Industries Transparency Initiative
AGS	Afghanistan Geological Survey
AMEA	Academic Mining Education in Afghanistan
CNPC	Chinese National Petroleum Corporation
DAAD	Deutscher Akademischer Austauschdienst
FACT	Federation of Afghan Craftsmen and Traders
MCC	Metallurgical Corporation of China
MoCI	Ministry of Commerce and Industries
MoE	Ministry of Education
MoHE	Ministry of Higher Education
MoLSA	Ministry of Labour and Social Affairs
MoMP	Ministry of Mining and Petroleum
MoWA	Ministry of Women's Affairs
TVET	Technical and Vocational Education and Training

1. Introduction

Afghans have long sought refuge in Europe, but the waves of Afghans who have embarked en route to Europe in recent months, particularly Germany, are unprecedented. Some leave their homes because of the worsening security situation, but it is not only the insurgency that pushes Afghans to leave their home. International engagement in Afghanistan over the past decade has resulted in a new generation of skilled and educated Afghans who have developed a desire for economic welfare and basic necessities. However, with international attention having shifted to Syria, development assistance has been on decline since 2014, resulting in economic stagnation and rising unemployment.

Afghanistan is abundantly rich in natural resources, most of which are still untapped. If commercially exploited, these deposits could, in light of dropping aid levels, not only generate billions of dollars in tax revenue for the Afghan government, but could also be an engine of growth for the Afghan economy and provide jobs for thousands of unemployed Afghans. Despite promising prospects, a major obstacle to the development of the mining sector in the future is the severe shortage of Afghan well-trained technical experts, administrators and managers in the raw materials sector.

The proper development of the Afghan mining sector is essential for Afghanistan's future for the following reasons:

- **Strengthening the government**: After more than a decade of major humanitarian and development assistance, Afghanistan continues to rely heavily on international donors to finance their budget. In 2015, international donors covered two-thirds of Afghanistan's USD 7.2 billion annual budget. Consequently, without the help of international donors, GoIRA cannot remain functional. By increasing the government's revenue in sectors such as mining, the Afghan authorities could move towards operating independently of international assistance.
- **Curbing the insurgency**: Local warlords and insurgents are currently extracting most of Afghanistan's gemstones illegally. According to a 2015 United Nations (UN) report, minerals are the Taliban's second largest income source after poppy[1] and thus finance their insurgent activities.
- **Boosting Afghanistan's economy**: The Afghan economy has experienced high growth since the ousting of the Taliban regime in 2001. Yet most of this 'growth' is the result of billions of foreign aid artificially inflating the economy. With most of the growth happening in the services sector (its share of GDP grew from 38.7% in 2007/08 to 50.2% in 2013/14) rather than in agriculture or industry, the decreasing aid levels have led to economic stagnation.[2] Consequently, economic growth has dwindled from 21% in 2009 to 1.3% in 2015.[3]
- **Decreasing the brain-drain**: In 2015, more than 300,000 Afghan refugees have migrated to Germany alone. According to preliminary findings of a longitudinal migration assessment study with migrants who have fled abroad, the lack of economic opportunities ranks among the top three reasons for Afghans to leave their home country.

[1] Ibid.
[2] Noorzoy (2014)
[3] World Bank (2016) and Noorzoy (2014)

In summary, developing the mining sector holds much potential for economic, social and political reasons.

However, the sustainable development of the sector depends on many different factors. To reach a vibrant mining economy, the *proper* development of the labour market is certainly one of them. For a *proper* development, fostering technical advancement is absolutely essential. However, this does not only require capacity building on the supply side of labour (i.e. the private sector) but also the demand side (i.e. mining employees and workers on all levels). According to our findings, many mining companies (both Afghan and international) continue to hire foreign experts or foreign-trained Afghan experts. In order to increase the technical expertise of Afghan experts in mining related fields, the Federal Foreign Office of Germany commissioned the *Gesellschaft für Internationale Zusammenarbeit* (GIZ) and *Deutscher Akademischer Austauschdienst* (DAAD) with the creation of the Academic Mining Education in Afghanistan (AMEA). This joint project focuses on modernising Afghanistan's university education through the training of experts and university lecturers in mining related fields and adjusting the education to the needs of the market economy.

This study was commissioned by GIZ with the aim of drawing a picture of the needs and demands of the private sector in the Afghan mining industry. The objective of this nation-wide consultation was to a) provide a thorough picture of the specific skills demanded by the Afghan mining sector through the establishment of job-specific competency profiles; and b) based on the information gained through the first phase of the research, design workshops in close collaboration with private sector actors in order to improve the practical skillset of Afghan students in mining-related fields.

2. The current state of the Mining sector labour market

a. The Afghan Mining Sector

According to information taken directly from the website of the Ministry of Mines and Petroleum, the government currently has a total of 301 mining licenses registered with the Ministry of Mines. However, of these 301 licenses, 112 have been cancelled, suspended or have expired. The state of a further 102 is unclear. Fewer than 90 companies are currently in possession of an active mining license in Afghanistan, and 68 of them are situated in Kabul. In other words, three licenses out of ten are currently active[4] and those are mostly controlled from the capital. The exact number of mines currently being explored or extracted is difficult to measure – the information publicly available is not updated. The table below gives an overview of the mining operations identified by Samuel Hall researchers, based on interviews with representatives from the Ministry of Mines and Petroleum as well as the private sector.

Estimations of Afghanistan's resource wealth vary between 1 trillion USD[5] and 3 trillion USD.[6] Consequently, major economic and employment hopes are set on the development of the Afghan mining sector. Mes-Aynak (copper) in Central Afghanistan and Hajigak-Bamyan (iron) in Northern Afghanistan are estimated to be among the largest reserves of copper and iron in the world. Afghanistan is also home to more than 300 other mineral reserves: Hydrocarbons in the north (especially at Amu-Darya and Aghan-Tajik basin), Gold, Platinum, Silver, Chromite, Tantalum, Lithium, Uranium and Aluminium. Furthermore, the country also has massive deposits of precious and semi-precious stones including emeralds, rubies, tourmaline, aquamarine, amethyst, types of sapphires, turquoise, and lapis lazuli.[7]

Current mining sites

No.	Name of the mine	Location	Contracted company	Status
1	Kuhi Safi Chromite	Parwan	Hewad Brothers	Extract without exploration
2	Chisht Marble	Herat	Braradaran Adil	Active
3	Khanshin Rukham Marble	Helmand	Baradaran Ihsani Marble Production	Active
4	Afghanwhite Marble	Nangarhar	-	Active
5	Chines Marble	Wardak	-	Active
6	Trowarten Marble	Lolinj district of Parwan	-	
7	Onyx	Helmand	-	Illegal extraction and sent to Pak
8	Mes-Aynak/Aynak Cooper	Logar	MCC chines company	Work is on hold, negotiation is on-going
9	Dari-e-Suf coal	Sari-e-Pul	Govt. enterprise and Brotheran Khushak	Active, governmental enterprise
10	Hajigak Bamyan	Bamyan	Only companies were shortlisted for awarding contracts	No-contract
11	Baboos, Mughulkhil and Sarkunjak chromites	-	Stana Baba	-
12	Quarts sand of Chashma Shifa	Balkh	Yasmin Ltd	Active
13	Badam Nirkh chromite	Maidan	Metal Mining UK	Active, exploration

[4] The data currently available was last updated 2 years ago. Given the overall security as well as economic situation in Afghanistan, it seems unlikely that the situation has improved since.
[5] Risen (2010)
[6] Sheffer (2014)
[7] Afghanistan Geological Survey (2016)

		Wardak		process
14	Bakhood Flurospar	Kandahar	Amania	Exploration
15	Flurite of Nish district	Nangarhar	Amania	Cancelled
16	Kohi Safi chromite	Parwan	Afghan active Mining	
17	Azure	Badakhshan	Lajwarddeen Mining	Cancelled
18	Sabzak Coalmine	Herat	Brotheran Khushak	active
19	Deh Iman Coal mine	Bamyan	Aslami Stone Mining	Cancelled
20	Jum district Granite	Badakhshan	Badakhshan Marble and Granite Co.	Put on Hold
21	Sordak alabaster	Helmand	Arif Sarwari Mining	
22	Amu Darya	Sar-i-Pul	CNCP-IW	Active
23	Afghan-Tajik-Basin	Takhar-Jawzjan along Turkmenistan border	Dragon Oil, Turkish Petroleum and Ghazanfar Group	Active
24	Tirpul oil	Herat	-	Has not been awarded
25	Helmand Basin	Helmand	-	Has not been awarded
26	Ghori Cement	Baghlan	Afghan Investment Company	Active
27	Nuraba and Samti Gold	Takhar	West Land General Trading	Active
28	Qara Zaghan Gold	Baghlan	Afghan Krystal Natural Resources	Active
29	Western Garmak Coal	Samangan	Khoshak Brothers	Active
30	Katawaz Basin	Ghazni	-	Has not been awarded

Large Scale Mining: a long way to go

The most promising deposits in Afghanistan in terms of opportunity for employment and government revenue are Afghanistan's large deposits, with Mes Aynak (copper), Hajigak (iron ore) and Amu Darya (petroleum) leading the way.

- Mes Aynak was awarded to Chinese company MCC (Metallurgical Company of China), but recent discoveries of Buddhist antiquities at the mining site have brought exploration activities to a halt. Additionally, the Chinese are pressing for a renegotiation of the terms of their contract. The new Afghan mining law forces companies to process raw materials inside Afghanistan, only allowing them to export the finished product. However, the procedure used by MCC in Afghanistan to process copper is dependent on the usage of materials and technologies currently not available in Afghanistan. Consequently, MCC presses for an exemption from the legally binding obligation to develop the value chain of raw materials inside Afghanistan. Negotiations are on-going, but are unlikely to yield to a continuation of mining activities any time soon.

- Negotiations at the large iron ore deposit in Hajigak in Western Afghanistan came to a halt before any contract had been awarded. An international consortium led by Indian mining companies won the rights to explore the Hajigak deposit, but no contract has been signed to date. Immediately after the Steel Authority of India Ltd (SAIL) consortium won the bid on the Hajigak tender, news appeared that the proposal was deeply flawed, violating bid conditions and making it technically impossible for Afghanistan to ever collect royalties.[8] According to officials, the Afghanistan Geological Survey (AGS) faces conflicts of interest: on one hand, the organisation conducts surveys and provides advisory services for the Afghan government. Yet at the same time, they are also hired frequently by mining companies for proposal writing. In short: The AGS writes proposals (on behalf of companies) that it also assesses during the bidding process (on behalf of the government).

[8] Ghanizada (2014)

Regardless of the unsure future of these large mining deposits, a potential source of large-scale employment for the Afghan people and tax revenues for the Afghan government, the following is almost certain: even under ideal conditions, the development of these mines will take years. Before extraction can even begin, the proper development of the necessary infrastructure alone will take years. According to several sources, Mes Aynak is so large that it will not only require its own railway but also its own power plant. Consequently, large-scale mining operations are unlikely to have a positive effect on the labour market in the short term.

Small-scale mining: dominated by illegal extraction

For the moment, the Afghan leadership has decided to focus on small- and medium-scale mining, considering their proper development as a prerequisite to tackle big-scale mining. Capacity building both at the private sector level as well as the ministerial level is considered essential. However, considering that a lot of the small-scale mining is currently being extracted illegally and unprofessionally, the hopes for a vibrant labour market in that sector remain low.

Small-scale Mining: Dominated by illegal activities

Although small-scale mines have the advantage of requiring less initial capital investment and are consequently much more attractive and feasible for domestic investors, the realities in Afghanistan paint a rather grim picture. On one hand, small-scale mining is much more active than the exploration of large deposits, but most of it happens illegally. There are no exact figures, but various sources count between 2,000 and 3,000 illegal mining sites all across the country[9] compared to only a few hundred legal licenses. As previously mentioned, only 8% of Afghanistan's mining activities are said to be legal, depriving the government of millions of royalties each year. The hopes of getting the sector under government control are vanishingly low, unfortunately.
A first attempt was made recently by using a stamp to mark the legally extracted stones, hence distinguishing them from their illegal counterparts. The Afghan initiative is supported by the United Nations, who agreed to issue a worldwide ban for 'stamp-less' Afghan raw stones.

Medium-scale mining: the (near?) future

The Afghan marble sector is considered to be one of the fastest growing industries in Afghanistan. Different types of marble, with colours ranging from white to multi-coloured to black, are being extracted all over the country.[10] Due to its high-quality, abundant availability and the geostrategic location of Afghanistan between the Middle East and Asia, the sector has the potential to increase their exports from annually USD 15 million (in 2011) to USD 450-700 million within the next years – assuming that the necessary investments in technology, infrastructure and business support are made.[11] Although the lack of skill cannot be denied, short term on-the job training, particularly for low-skilled labour in processing plants, can be sufficient.[12]
It is perhaps Afghanistan's most developed part in the resource sector, both in terms of skill and technology. Currently, the Afghan marble sector employs more than 50,000 employees in more than 70 companies. The Afghanistan Association for Marble is very hopeful for the future potential of the sector, due to both global demand and excellent quality of Afghan marble. However, the sector is just beginning to develop – hence, the potential for large-scale employment programs is very possible in the future, however highly unlikely at the present moment.

[9] Mohammdi (2015)
[10] Kabul, Bamyan, Helmand, Herat, Nagarhar, Wardak, Logar, Faryab, Paktika, Samangan, Ghazni and Parwan
[11] Doclecture (2015) and Motevalli (2010)
[12] AISA (2012)

The Afghan Mining Law

The Afghan mining law was updated in 2014 but still does not match international standards. Although containing many improvements compared to the old law, the updated version falls short of being able to tackle one of the biggest obstacles to the successful development of the sector: corruption. Critics also complain that the new law is unable to properly assess issues of environmental and social impact, dispute resolution, monitoring and transparency.[13]

> *'Former Minister Shahrani's declaration that the Indian consortium won the Hajigak tender ignored these obvious deficiencies of the consortium's bid', the officials said, adding that the Ministry of Mines and Petroleum would still entertain working with the Indian consortium is beyond comprehension and a matter worthy of investigation'.*
>
> **Khaama Press 2014**

The next chapter will present an overview of the research objectives and methodology followed by the presentation of findings.

b. Report Objectives and Overview of Research Questions

Objectives

This report is written for stakeholders, key partners and field practitioners to develop further guidance and understanding on improving the link and collaboration between key stakeholders in regard to the Afghan mining sector.

The study had the following core objectives:

1) *Provide GIZ-AMEA with a thorough picture of the labour market in the mining sector*

2) *Increase the practical component in Afghan mining education through establishing workshops for students with a selected number of companies. Initially, it had been planned to conduct a large-scale internship programme. But due to the underdeveloped stage of the sector and the current economic downturn, hence a lack of demand for interns, SH in close collaboration with GIZ decided to shift to a workshop-based approach. Through these workshops, students were given the opportunity to present themselves to companies in intense 3-day workshops, potentially giving them the opportunity to be offered an internship at a later stage.*

Research Questions

The research was led by a number of different research questions, specified in the table below:

Objective 1: Provide AMEA with a thorough picture of the labour market in the mining sector		
Stakeholder	Questions	Sources of verification
Public Sector	How big is the potential of the labour market in the mining sector? What are the main obstacles to the development of the labour market? Which skill-level of labour holds the most potential for growth?	Desk review KII
Private Sector	In which area do they lack the most (Afghan) employees in the short-, medium-, and long-term? Map current mining engagements in Afghanistan	Desk review KII

[13] O'Donnel (2014)

Academics - Professors	How many graduates graduate in mining related fields each year? How many find a job? In which fields? Do universities believe their students are well prepared for the challenges of the labour market?	Desk Review KII
Academics Students	How many students graduate in mining-related fields each year? How do students search for jobs?	Desk review FGD

Objective 2: Provide AMEA with the information **necessary to create partnerships for the establishment of internships that build capacity**		
Stakeholder	Questions	Sources of verification
Public Sector	How can the gap between academic knowledge and practical challenges be overcome?	Desk review KIIs
Private Sector	Which role can the private sector play in the establishment of internships? What are their expectations? What is their capacity when it comes to providing internships?	Desk review KIIs

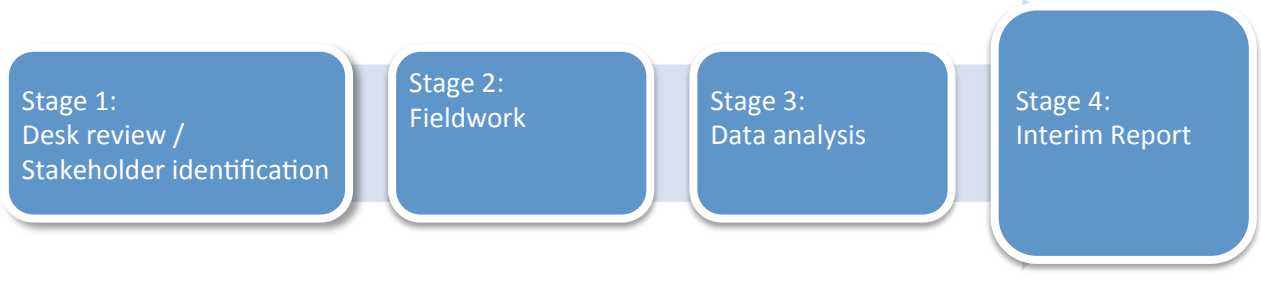
Objective 3: Organisation of roundtable discussion and workshops		
Research	Questions	Sources of verification
Discuss way forward	Present findings of Phase 1 and work on a way forward during the discussion to increase the practical component of academic mining education in Afghanistan.	Roundtable Discussion
Increase practical education	Add a practical component by identifying companies willing and able to hold workshops with students, teaching them practical skills they lack during their University course.	Desk review

3. Methodology

a. Approach Outline

The team undertook a 4-step process in Phase 1 and another 4-step process in Phase 2 to conduct this research. In the first step, the research team analysed the current demand for labour in the mining sector before establishing competency profiles for mining engineers and geologists, the basis for the workshops held in Phase 2.

Phase 1: Capacity Analysis (October & November 2015)



Phase 1: Capacity Analysis

In line with the Inception Report provided by Samuel Hall, research focused on assessing the state of the Afghan mining sector and higher education in mining-related fields. The analysis is based on a large number of interviews with four different groups of stakeholders from three different locations in Afghanistan: Mazar-e Sharif, Logar and Kabul.

- **Students:** The research team approached students from three different public and six different private universities as well as four different TVET institutes.
- **Academic Stakeholders:** Private and public universities as well as TVET institutes.
- **Private Stakeholders**: National as well as international stakeholders from the private sector whose business revolves around the Afghan extractive industry – either in terms of extraction or the final product.
- **Public Stakeholders:** Interviews were carried out with representatives from five different ministries as well as other organisations or institutions of interest.

Target Group	Research Tool	Goal	List of Organisations	Number of KIIs/FGDs
Public Stakeholders and other organisations of interest	Key Informant Interviews (KIIs)	Analyse the state and capacity of the labour market in the mining sector	MoMP, MoCI, MoE, MoL, MoWA, ACCI, AGS, AIETI, FACT, Turquoise Mountain, Zardosi	18 KIIs
Academic Stakeholders	Key Informant Interviews (KIIs)	Gain an understanding of the Afghan mining education and identify suitable partners for a partnership with the private sector	Public Universities: Kabul, Kabul Polytechnic, Balkh Private Universities: Jahan, Mashal, Salam and American University of Afghanistan (AUAF) TVET institutes: Logar Mining Institute and Balkh Institute of Oil and Gas	11 KIIs
Students	Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs)	Analyse the desires and expectations towards their future employment, as well as assess their skill level	Public Universities: Kabul, Kabul Polytechnic, Balkh Private Universities: Bakhtar, Kardan and AUAF TVET institutes: Logar Mining Institute and Institute of Accounting & Administration	7 KIIs, 9 FGDs
Private Sector	Key Informant Interviews (KIIs)	Analyse the capacity of the mining sector, assess the expectations towards future employees and the willingness to host workshops and participate in a partnership	Afghan Marble Association, Afghanite, Amania Mining, CEFE Group, Centar, Green Tech, Marmaristan, MCC, Omran Geotechnical Company, Green Tech, Geo Search, Pamir Mining, Qasemi Group, Yasamin Mining	13 KIIs

- **Phase 2: Establishing Workshops / building partnerships (March until May 2016)**

Phase 2: Establishing Workshops / building partnerships

Phase 2 of this study was based on another round of interviews with actors both from the private and academic sector and focused on the following components:

Competency Profiles
In order to support the University of Freiberg's task to update the mining curriculum at Kabul Polytechnic University, the research team established so-called 'competency profiles' or 'job profiles' demanded by the private sector, which identified the specific practical skill-set employers look for when examining graduates for positions related to geology and mining engineering.
Based on skill-sets and job profiles demanded in other mining sectors (i.e. Pakistan, India, South Africa), the research team developed a comprehensive job profile for graduates in both mining engineering and geology. In addition to presenting companies with options for different skill sets in the aforementioned subjects, these job profiles are organised along the following three questions:

- Which one of the following skills do you look for when advertising positions for new, freshly graduated mining engineers and geologists?
- Which one of the following skills are minimum requirements for freshly graduated mining engineers and geologists in order for them to be able to find a job in the Afghan mining sector?
- Which one of the following skills do Afghan mining engineers and geologists possess when they graduate from an Afghan University?

In a second step, the information collected was shared with selected representatives from the private sector in Afghanistan, adapting the job profiles to the Afghan context.

Roundtable Discussion
During a roundtable discussion held at GIZ's premises in Kabul, Samuel Hall presented the findings made and the competency/job profiles established during the research phase, discussing a way forward in respect to establishing workshops and creating a strategic partnership.

Workshops
In close collaboration with professors from Kabul Polytechnic University and a selected number of private sector actors (Afghanite, Omran Geotechnical Company, and Geo Search), Samuel Hall researchers developed workshops based on the identified competency profiles.

Partnership
The roundtable discussion also gave the private and academic sector the possibility to discuss the nature and content of a partnership for future collaboration.

b. Challenges

Identifying the needs of the labour market

The answers given during this first round of interviews that targeted the needs of the labour market remained very vague and unspecific, for two reasons mainly:

- **Low expectations**: Given the out-dated curricula[14] at Afghan Universities in mining-related fields, as well as the complete lack of a practical component, the expectations or job-profiles for graduates from Afghan Universities remain low. Companies expect to be conducting a lot of on-the-job training.

- **Stagnating Economy**: Due to various reasons (e.g. security, lack of [foreign] investment, change in mining regulations, low international commodity proces after 2009 and 2012) many companies have downsized both their operations as well as mining-related staff to a great extent. Consequently, they were not able to name specific job profiles, as they have not gone through the process of hiring new employees in a long time.

Identifying options to support an Internship Programme

The initial goal of this research, apart from identifying the needs of the labour market, constituted establishing an internship programme in cooperation with private stakeholders from the mining sector and the academic sector in Afghanistan.

While approaching companies for field research purposes, Samuel Hall did identify a need for highly qualified personal. However, given the underdeveloped state of the large-scale mining sector, there currently is a lack of capacity for large-scale internship programmes. Although companies confirm that they will start or continue with mining operations and will seek qualified personnel, there currently is only limited capacity.

Consequently, in order to achieve a sustainable outcome for this project, Samuel Hall decided to amend the content of phase 2 from a focus on establishing an internship programme to the establishment of a) a *strategic partnership* between the private and the academic sector in the mining industry and b) workshops to additionally enhance students' practical skills.

[14] Sigar 2016: "Afghanistan's Oil, Gas and Minerals Industries: USD 488 in US Efforts Show Limited Progress Overall, and Challenges Prevent Further Investment and Growth", p. 7.

4. Findings and Analysis

a. Capacity of the labour market

'Afghan mining sector labour market? Which labour market? There is none.'
Private Sector Actor

How big is the potential of the labour market in the mining sector? What are the main obstacles to the development of the labour market? Which skills are most important to employers?

When asked about the current state of the labour market in the mining sector, all students voiced concerns. They do believe that the extractive industry sector holds a large potential for Afghanistan, particularly in light of decreasing aid levels. However, activities in the mining sector are very limited at the present moment, as is also apparent from the declining number of active licences stated above. The top four obstacles to the development of the mining sector are:

1. Security
2. Corruption
3. Lack of technical expertise and proper machinery
4. Lack of (foreign) investment

'When President Ghani came into office, he banned the export of raw marble in an attempt to force businesses to focus on exporting finished products, as this is more profitable than exporting raw stone. But that is absolutely not reasonable at the moment, because we neither have the technology nor the knowledge. Plus, exporting marble to Europe and the United States means that we have to compete with very high European standards – and that is just very unrealistic at the moment, given that we are just beginning to develop the sector. His decision destroyed our business'.
Private Sector Actor

According to most students' opinions, the proper development of the mining sector will take more than five years, potentially longer. When asked about their chances of finding a job after they graduate, the opinions vary depending on their field of study. Whereas all law students interviewed (from private universities) are optimistic of finding a job after they graduate, only about half of TVET students and students of mining-related fields (from public universities) believe that they can find a job after they graduate. Not only do they believe it will be difficult due to the current underdeveloped state of the sector, but also because, as one student put it, 'I think if companies hire people according to their intelligence and qualifications, then we can find jobs. But as I see the current situation, it would be very difficult to find a job because all jobs are filled with people who have a middle-man in this organisation'. In other words, our findings suggest that in Afghanistan, employees and interns are not hired based on their skills but based on their connections. Students also mention that their lack of practical skills poses a problem to finding employment. This impression by students is reinforced by the KIIs conducted with stakeholders from the private sector. When asked for their main concerns about the education of Afghan students, employers named the following reasons as most important:

- Lack of practical experience
- Out-dated curricula
- Lack of software skills (e.g. GIS and other related software)
- Lack of English

Private sector actors also criticised the Afghan mining law in respect to its implementation. There were two main view points expressed during the interviews:

- The law is a problem: Multiple policy changes and a vast bureaucracy have had a negative impact on foreign direct investment. Respondents also criticised that non-

Afghans who simply copied foreign mining law without adapting it to the Afghan context drafted the law.

- The implementation is a problem: Respondents also stated that governmental representatives consciously or unconsciously use existing gaps or flaws of the mining law to the disadvantage of the sector.

How many graduates graduate in mining-related fields each year? In which fields? How many find a job right after graduation?

When it comes to assessing which programs are currently highest in demand on the mining labour market, answers given by professors often remained rather vague and assertive – or they were even contradictory. For example, in one institution Professor A named 'Geology' as being lowest in demand on the labour market whereas his colleague, Professor B, believed 'Geology' to be highest in demand. This might be because there is no exact data on the career paths of students after graduation, so professors and teachers can only guess. Based on these guesses, it seems that students with a business/economic background (Economy, Management, Business Administration) find jobs easiest since they are not bound to one sector. Both students and their professors complained about the lack of current employment options in the mining sector and stated that many students in mining-related fields seek employment options outside of their sector, e.g. in the construction sector or at field-related Ministries (e.g. MoMP). There also is a lack of information on what career paths are available in the sector: First, there is no proper labour market information system, making it hard for students to identify the different actors in the sector, their field of action and potential open positions. Additionally, students are also not aware of the career paths available to them, apart from a career at the Ministry of Mines and Petroleum (MoMP).

Which skill-level of labour holds the most potential for growth?

All four stakeholders had different opinions and made different guesses on the potential for the different levels of labour. However, the most overlap existed in two sectors: low-skilled labour and highly skilled labour. The construction phases of large-scale mining operations in particular will have much capacity for a large labour force. Low-skilled labour does not require any special education, and job qualifications will be obtained through on-the-job training. The second area that holds a large potential for growth is the area of highly skilled labour, mainly because the positions currently taken up by foreign experts could be filled with well-educated Afghans.

What is the hiring process for new graduates?

Afghanistan is a country heavily relying on networks. Several of the companies approached confirmed that they mostly hire new employees through personal networks – i.e. current employees will recommend family members or friends. Ethnicity also plays a role in the hiring process. As one company put it, 'If we hire a new mining engineer or geologist for a mine in a Pashtun area, and we can choose between a less qualified Pashtun and a more qualified Hazara, we would of course hire the Pashtun. You cannot send a Hazara working in a mine in a Pashtun area'.
During the research, we came across a job advertisement of one of the interviewed Afghan mining companies. However, the advertisement was run only on a Pakistani website, suggesting the company had no intention of hiring or even of merely advertising the position to Afghans due to the perceived lack of qualification, both theoretical and practical.

b. Afghan higher education in mining related fields

'I don't need engineers with Masters or PhDs. I need [engineers with] bachelor's [degrees] with practical experience, [engineers with] bachelor's [degrees] who know how to use and operate the technology we use!'

Private Sector Actor

> *'We had two Italian geologists visiting and asked two Afghan professors to come along and visit our mine. They showed up in suits, completely improperly dressed for visiting a mine. But how would they know? They had never been in a mine before. Needless to say, they didn't contribute to the study. They didn't know how'.*
>
> *Private Sector Actor*

The main problem with mining education in Afghanistan seems to be that it is not only a) outdated but also b) lacks practical training. Updating the curricula poses a challenge, as the professors at public universities have either a) been trained during Soviet times and are themselves unfamiliar with modern mining technologies, or b) if their education is more recent, they lack practical experience. Respondents also expressed their concern that professors might even try to prevent the update of curricula out of fear of losing their current positions. All students felt more or less theoretically prepared for the labour market, but expressed their desire for more practical training. Many students hope to attend one of the public universities, and often only attend private universities if their grade average in the Konkur was not high enough.

Afghan TVET institutes face a different problem: students at these institutes usually neither have the grade average to attend public university nor the financial background to pay for a private university. Out of the average 500,000 Afghan students who apply for university each year, only 150,000 are accepted in public universities, and 350,000 need to seek education elsewhere. Consequently, rather than consciously choosing TVET as a career path, Afghan TVET students are often 'forced' to choose this path. After graduating from their TVET institute, 50% will apply for university, and the remaining 50% quit altogether and do not enter the labour market at all. Afghan TVET institutes have an image problem in the public mind, as they are commonly said to educate students for '3D' jobs: those that are difficult, dirty, and dangerous.

> *'Shift your focus [to] target the people who actually want to do the work. Currently, there are 90,000 students in formal TVET who have no interest in the sector and only want to continue with higher education. On the other hand, you have 600,000 "students" who are currently employed in informal apprenticeships, for example a father and his son in a workshop. That is the economy of Afghanistan, and this has been neglected. Get these 600,000 students into the school system, and make it formal through an official apprenticeship program. These 600,000 students are the ones that will actually sit in a workshop and work – plus, they are already part of the labour market. The biggest potential in Afghanistan is for this group'.*
>
> *TVET Expert*

The reputation of TVET institutes is not only low among the Afghan public but also among the private sector. None of the interviewed private sector actors employed TVET graduates, and most had not even heard the term before. This matches our findings from the interviews with TVET teachers. At the Logar Mining Institute, only 1/3 of the students find a job after they graduate, the large majority in mining non-related fields. In Balkh, 50% of the students continue on the path of higher education, and almost all of the remaining 50% seek employment in non-mining related fields. The reason that TVET institutes in Afghanistan are not well regarded in the business community is because they only provide theoretical training and do not properly prepare their students for the practical challenges of the labour market. 'We are pumping in millions [and] provid[ing a] huge amount of equipment, but there is absolutely zero outcome. Less than 10% of teachers are competent, [and] the whole system needs an overhaul', explains one TVET expert. TVET institutes offer multiple

programs in different areas – but they do not seem to be tailored to the needs of the market. Additionally, students at TVET seem to be the wrong target group. According to the interviewed experts, the current 90,000 TVET students only use the institutions as a stepping-stone into higher education and do not have any interest in the TVET-labour market. Initiatives such as the National Skills Development Program (NSDP) have recognised these shortcomings in the TVET framework, provided analysis for the regulatory and legal reforms necessary to reshape the Afghan TVET sector and established pilot projects. Over the course of 6 years, the initiative produced 7,720 Graduates in six pilot TVET institutes,[15] of which 75% found employment.

c. Open-pit vs. Underground Mining

As of now, mining engineering is taught as one major that combines both open-pit and underground mining. During the course of the study, a discussion emerged among the German and Afghan experts whether both topics should be taught separately (as 'Mining Engineering – Open Pit' and 'Mining Engineering – Underground Mining') or combined (one single major 'Mining Engineering'). Professors at the University of Freiberg, who have advised Kabul Polytechnic University on the updating of the curricula, and professors at the aforementioned university have differing views on the matter. Hence, the question was included in the roundtable discussion, with a very clear outcome: seven companies preferred a common major compared to only two companies who were in favour of a separation.

Why should open-pit and underground mining be taught in one single major? The answer is simple: companies do not hire engineers for only one type of mine, they hire mining engineers to work on different projects. If both fields are taught separately, students will have a clear disadvantage on the labour market, as mining companies confirmed that they will always prefer the mining engineer who has knowledge about both types of mines to the engineer who only specialised in one field.

The following table will give an overview of the different academic institutions approached and the programs they offer at their institutions.

[15] NIMA, ANIM, AIT, Blind School, Auto Mechanical Institute, and Computer Institute.

University/Institute	Offered Programs	Number of graduating students p.a. in mining-related fields	Students' career path after graduation
TVET Balkh Institute of Oil & Gas	3 Programs (2 yrs, 3 yrs and 5 yrs) in 6 departments: Solid minerals, Oil & Gas, Electro Techniques, Industries & Metals, Water Supply, and Vehicle Maintenance	300	Students either continue to higher education or work in mining non-related fields. Only few work in mining sector.
TVET Logar Mining Institute	1 program/department: Extraction of Minerals	250-300	Only about 1/3 find jobs (110-160), mostly in non-mining related fields.
Bakhtar University	5 departments: Law Journalism Civil Engineering Computer Science Business Administration	400-500	Graduates in Engineering, Computer Science and Business Administration find jobs easiest. Most of them find jobs outside of the mining sector in different organisations and construction companies.
Kardan University	4 Departments: Business Administration Computer Science Civil Engineering Law and Political Science	Confidential	Graduates in Civil Engineering and Business Administration find jobs easiest, mostly in mining non-related fields.
AUAF	Management Business Administration Information Technology	/	Graduates in Management and MB programs find jobs easiest, but hardly in mining sector.
Balkh University	3 Departments: Engineering of Minerals Engineering of Petroleum & Gas Water & Environment	N/A	'Engineering of Minerals' – Graduates rarely find jobs in the mining sector, and they work in other sectors. The two other departments have been newly established, so there are no Graduates yet.
Kabul University	Geology Hydro Metrology Geography Environment	250-300	Geography students are often recruited in the MoFA for Cartography, Geologists will be hired in the MoMP/MoAIL/MoWE. Geologists find work easiest because they have a broader education. Geography/Hydro Metrology graduates are low in demand.
Kabul Polytechnic University	8 departments: Chemical Technology, Construction (Buildings, Roads, or Hydraulic), Computer Science, Geodesy, Geology & Mining, Electro-Mechanics	250-300	Students from mining related programs are lowest in demand on labour market. Only 20% find jobs right after graduation. Many try to find employment in other areas (like construction).

d. Enhancing practical education

Afghan graduated geologists and mining engineers have major problems in finding employment. This is not only because of the underdeveloped state of the sector, but because mining companies in Afghanistan often hire foreign experts or foreign-educated Afghans for their vacant positions of highly skilled labour. As mentioned before, this is because the curriculum at Afghan universities in mining-related fields is not only outdated, but also lacks practical experience. The lack of practical skill in particular poses problem to finding employment. 'When we apply for a job, the first thing they ask us about is our practical experience. Nobody is willing to hire somebody without work experience', says one interviewed student. Generally, the top four obstacles to find employment seem to be:

- Lack of employment opportunities
- Lack of network
- Lack of practical experience
- Lack of updated and relevant theoretical education

To successfully update the curricula of mining-related fields in Afghan universities, a market-driven approach is needed. In order to increase the employment rate of Afghan mining students, it is essential to first identify the demands of the labour market and the technologies and approaches used. Hence, Samuel Hall researchers, in close collaboration with private sector actors in Afghanistan, established so called 'job competency profiles' for mining engineers and geologists, based on the demands of Afghan mining companies.

Competency Profiles – Mining Engineering

A mining engineer is tasked with the proper planning and safe development of a mine. As they are involved in all aspects of a mining project, they need to be familiar with the different stages of a mining operation and need to have a thorough understanding of the effects of mining on the surrounding environment. Even before a new mine is developed, mining engineers determine the viability of a new mining project and organise its structure. When developing specific job profiles for mining engineers in Afghanistan, Samuel Hall researchers drew on a wide array of job profiles from all around the world with a particular focus on neighbouring countries (Iran, Pakistan and India) to bring the general international requirements and standards closer to the reality in Afghanistan. A third round of interviews with academic private sector actors was conducted to further refine the list of competencies and identify the specific skills demanded at each individual company.

MINING ENGINEERING: General Job Profile

COMPANIES' requirements	A	B	C	D	E	F	G
…participate in drilling and blasting activities in the quarry	√		√	√	√	√	
…**are able to supervise the driller, shotfirer, assistant shotfirer and general quarry labourers**	√			√	√	√	√
…do routine blasthole **sampling for laboratory analysis**	√	√	√	√	√	√	√
…Supervise primary and secondary crushers					√	√	
…Ensure that execution of drilling and blasting activities is according to **the mining plan**	√			√	√	√	
…Effectiv**ely utilise earth moving equipment**	√				√	√	
…**are familiar with safety procedures**	√	√	√	√	√	√	√
…prepare daily reports on consumption of explosives	√	√		√	√	√	√

All companies stressed that they mainly expect graduates to participate in the field and hence to be able to participate in drilling and blasting activities, to be familiar with the technology used and to have an understanding of modern health and safety requirements. The below table provides a better understanding of the general knowledge, specific techniques and software used within the Afghan mining sector.

MINING ENGINEERING: Key competencies

COMPANIES' requirements	A	B	C	D	E	F	G
							√
GENERAL KNOWLEDGE							√
Industrial rocks and minerals	√	√		√	√	√	√
Basic unit operations of surface **mining**	√		√		√	√	√
Use of tools, equipment and machinery	√	√	√		√	√	√
Different drilling equipment **and their uses**	√	√	√		√	√	√
Explosive and blasting operations	√		√	√	√	√	
Different crushing equipment			√		√	√	
Safety precautions in surface mining	√	√	√	√	√	√	
Preventive maintenance of different mining equipment	√	√	√		√	√	
Design of haul road					√	√	√
							√
							√
SPECIFIC TECHNIQUES							
Identify different types of mining methods	√	√	√	√	√	√	
Identify different industrial **minerals and rocks**		√		√	√	√	
Identify name and functions of various drilling equipment	√	√	√		√	√	√
Operate and maintain top-hammer drills including start-up/shut-down, positioning, drilling, drill rod changing **and drill rod retrieval**	√	√			√	√	√
Operate and maintain down-the-hole drills including start-up/shut-down, rock drilling **and rod retrieval**	√				√	√	√
Operate and maintain a jack-hammer/hand-held drills including start-up/shut-down, rock drilling **and rod retrieval**	√			√	√	√	√
Operation and handling of Air Compressors				√	√	√	√
Usage and Preparation of High Explosives				√	√	√	
Conduct safe blasting operations	√			√	√	√	
Proper storage of explosives and detonators	√			√	√	√	
Operate and maintain loading and back-hoe **shovels**[16]				√	√	√	
Operations and maintenance of primary crushers					√	√	
Operations and maintenance of belt conveyor system	√				√	√	
Awareness about safety procedure at mine site	√		√		√	√	
Bucket whill excavator	√	√	√		√	√	√
Mine elumination	√	√	√		√	√	√
Ground vibration and ground control	√	√	√[17]			√	√
Flyrocks control and monitoring	√	√	√[18]			√	√

[16] some respondents claim that this technology is not in use in Afghanistan
[17] not expected from a bachelor student

Drainage system							√
Reclamation and Mine closure							
Surveying	√	√	√		√	√	√
Total Station		√	√		√	√	√
GPS	√	√	√		√	√	√
Track	√	√	√		√	√	√
Power transition	√	√				√	√
Rules and Regulation	√	√	√		√	√	√
Underground mining techniques (i.e. Coal Mining)	√	√	√		√	√	√
SOFTWARE							
AutoCad	√	√	√	√	√	√	√
Surpac	√	√	√	√	√	√	√
Data Mining	√	√	√	√	√	√	√

For mining engineering, the skills and competencies demanded by companies varied greatly for three main reasons:

1. **Type of Activity**: The private actors interviewed were engaged in consultancy as well as active exploration and excavation. Naturally, depending on the line of business, the specific requirements for mining engineers within a particular company vary.
2. **Type of resource**: For excavating mining companies, job profiles also depended on the type of resource excavated.
3. **Stage of Operations**: The specific needs and demands of the private sector will also depend on the stage of the mining activity - whether the company advertising the position is currently in the prospecting, development, exploration, excavation or reclamation stage of a mine.

It is important to note that mining companies ideally search for candidates who have a broad knowledge and are deployable in different mines at different stages of the operation. Nonetheless, a job profile is a very detailed description of skills needed for a specific position within the company. Hence, although a general knowledge of other areas is desirable, a job profile will always yield a relatively narrow description of the requirements of a specific position.

Competency Profiles - Geology

The main requirements in terms of skills and familiarity with different software can be found below. Graduates are expected to:

- Understand the exploration process and write exploration reports
- Determine scales, distances and elevations from imagery, surveys, maps and GIS applications
- Collect, compile and interpret historic information to plan geological investigations
- Prepare, analyse and interpret historic information to plan geological investigations

[18] not expected from a bachelor student

GEOLOGY: Key Competencies - skills

COMPANIES' requirements	A	B	C	D	E	F	G
…**determine different mineral types**	√			√	√	√	√
…Identify and interpret sedimentary processes/structures	√	√		√	√		
…Understand exploration process and write exploration reports	√		√	√	√	√	√
…determine type, degree and effects of rock and mineral alteration	√	√		√	√	√	
…determine scales, distances, and elevations from imagery, surveys, maps and GIS applications	√	√	√	√	√	√	√
…collect, compile, and interpret historic information to plan geological investigations	√	√		√	√	√	√
…conduct **geo investigations considering human health and safety**	√		√	√	√	√	
…interpret desformational history through structural and tectonic analyses	√	√		√	√	√	
…prepare, **analyse and interpret logs, and cross-sections maps from field investigations and GIS applications**	√	√	√	√	√	√	√
…identify and interpret fossils and fossil assemblages for age or paleo environ interpretation	√			√	√		
…plan and conduct mineral or energy resource exploration, evaluation and environ programs		√	√	√	√	√	
…manage**, develop, protect, or remediate surface water or groundwater resources**	√		√	√	√	√	
…be familiar with drilling and sampling	√	√	√	√	√	√	√
…be familiar with conducting feasibility studies	√	√	√	√		√	√
Define and **characterise hydraulic properties**	√			√		√	

A geologist is particularly involved in the exploration process of a mine, needs to have a general understanding of the whole exploration and excavation process and is expected to be able to interpret data and samples. In addition, they must:

- Understand the exploration process and write exploration reports
- Determine scales, distances and elevations from imagery, surveys, maps and GIS applications
- Collect, compile and interpret historic information to plan geological investigations
- Interpret desformational history through structural and tectonic analyses
- Prepare, analyse and interpret logs and cross-section maps from field investigations and GIS applications
- Be familiar with drilling and sampling
- Be familiar with conducting feasibility studies

A geologist's work also relies heavily on the usage of special software. In Afghanistan, there are several kinds of mining software in use. The below table will give an overview:

GEOLOGY: Key Competencies - software

COMPANIES' requirements	A	B	C	D	E	F	G
Surpac						√	
Datamine	√	√				√	√
Promine	√					√	
Mapping Software							
ER Mapper	√	√	√			√	
MapInfo			√			√	
Encom						√	
ESRI/GIS	√	√		√	√	√	
(GIS: Erdas)		√				√	
(GIS: ArcView/ArcGIS)		√					
(GIS: Ilwiss)		√					
GeoSoft	√	√	√		√	√	
Rockware	√					√	√
Slide	√					√	
Plaxis	√					√	√
Abaques							√
UDED – 3pec							√
Slop package							√
Surfer							√
Dips		√					√
Roclab							√
Rocscience							√
Autocad		√					
Flac 3D-2D	√					√	√

Workshops

e. Workshops

Samuel Hall researchers developed workshops for students from the Department of Geology at Kabul Polytechnic University. Designed in close collaboration with private sector actors, these workshops targeted key skills and competencies demanded by the private sector and identified during the research phase preceding the development of the training. Participation was limited to the 38 students currently enrolled in the 7th semester of the 'mining exploration' major.

Workshop 1: Software and Lab Workshop at Afghanite with Engineer Qambari

One of the main complaints of private sector representatives was the lack of familiarity with the modern software currently used in the mining sector. Hence, two of the workshops focused on teaching interested students the basics of working with modern computer technology. At Afghanite, students attended introductory session on two programs (ArcView / ArcGIS and Autocad) that had been identified as crucial to their future work over the course of the competency profiling exercise.

Content: On day 1 of the workshop, engineer Qambari introduced students to AutoCAD, a software for engineers, architects and construction professionals to create maps in 2D and 3D. The second day revolved entirely around GIS applications. Students were given the chance to create their own map and operate the application themselves using basic commands. On the last day, engineer Qambari continued the training by giving students a brief description of the practical considerations surrounding field investigations. He demonstrated the difference between practical fieldwork and abstract theory, insisting on the skills needed to operate microscopes and introducing students to different laboratory machines.

Day	Theme	Corresponding Competency	Number of students
Day 1	Plaxis 2D and Rocscience	Plaxis 2D and Rocscience Slide	10
Day 2	GIS	GIS	10
Day 3	DIPS and Roclab	DIPS and Roclab	10

Workshop 2: Software training at OGC with Mr. Ahmad Ali Ahmadiyar

At OGC, trainers covered several relevant mining software programs over the course of three days.

Content: On day 1, students were introduced to the usage of Plaxis 2D (Version 8.2). OGC's geotechnical studies require the use of advanced models to simulate time-dependent and non-linear behaviour of soils. Plaxis is able to map various geotechnical structures and their interaction with the soil. On day 2, OGC employees presented a training session on ArcGIS/ArcView. ArcGIS includes a string of interspersed applications, including ArcMap, ArcToolbox and ArcCatalogue. Combining these applications allows users to perform simple as well as advanced GIS tasks such as data editing, geographic analysis, geoprocessing, data visualisation, etc. On day 3, students worked with two types of software: Dips and Roclab. Dips is used for the analysis of orientation-based geological data, while RocLab is used to assess rock mass strength parameters and visualise changing parameters of rock mass.

Day	Theme	Corresponding Competency	Number of students Session 1	Number of students Session 2
Day 1	Auto CAD	Auto CAD	10	10
Day 2	GIS Applications	GIS	10	10
Day 3	Field Investigation	General Field Experience	10	10

Workshop 3: Laboratory at Geo Search with Mr. Reza Ahmadi

For the time being, neither students at Kabul Polytechnic nor Kabul University have regular access to a proper laboratory. They are unfamiliar with the practical work conducted on such premises. To remedy this crucial knowledge gap, the 38 trainees were split into three groups, with each group attending three laboratory sessions.

1. Session: Field investigation
   Working with a geological compass (Bronton Brand)
   - Dip
   - Dip Direction
   - Strike
   - Azimuth
   - Plotting Field Data on DIPS program

A geological compass helps geologists comprehend the tracks and breaks in the rocks at a mining site. To be able to properly understand a geological feature, they need to be able to determine its dip, dip direction, strike and azimuth.

2. Session: Rock Hardness
   Working with a geological hammer (Schmidt Brand ASTM D5873)
   - General Usage
   - Data Analysis

With the help of a geological hammer geologists can measure the hardness of rocks at the mining site. This is very important for the construction of tunnels and dams as it provides an indication of what types of rocks exist at mining or dam sites.

3. Session: Rock Mechanics
   Practical work in the laboratory:
   - RQD (Rock Quality Designation, ASTM D 6032)
   - UCS (Unconfined Compressive Strength ASTM D 2938)
   - PLT (Point Load Test ASTM D 5731)

RQD helps geologists determine the type and quality of rocks. UCS and PLT are essential elements when assessing the hardness and quality of rocks.

Voices

'What we study in the university is very outdated. These workshops helped us to become familiar with new technologies. Thank you GIZ!'

'I want to thank GIZ for conducting such trainings, for the transportation [and] for all the efforts they do to support the development of our educational level'.

STUDENTS

'When we joined these workshops, we actually thought we would go out of Afghanistan, because we didn't know that there are actually companies in our field of study in Afghanistan. We were told by our professors that we could only do practical slide tests at the MoMP – but we now saw that the companies can do that, too! We want GIZ to talk to our university so that we can [do] our 3 months practical work at the companies instead of the MoMP, because the companies have much more equipment'.

PRIVATE SECTOR

'This workshop is the first time the private sector could directly interact with Kabul Polytechnic University and its students'.

'The practical workshop at Afghanite introduced students to different maps. It complimented their theoretical studies and helped them adapt theoretical knowledge to real-life challenges'.

'These 3 days of workshops will have a lasting impact – I am certain that none of the students will forget the practical skills they have learned here. Mentioning these practical workshops in job interviews will help them get shortlisted for positions, hence putting them on the winning ticket for jobs'.

STUDENTS

'The amount of practical work we have done during these few days of workshops equals two semesters at University'.

'Of course we don't expect to learn how to use a software in three days. But these workshops did something far more important: they introduced us to the skills expected from us on the labour market'.

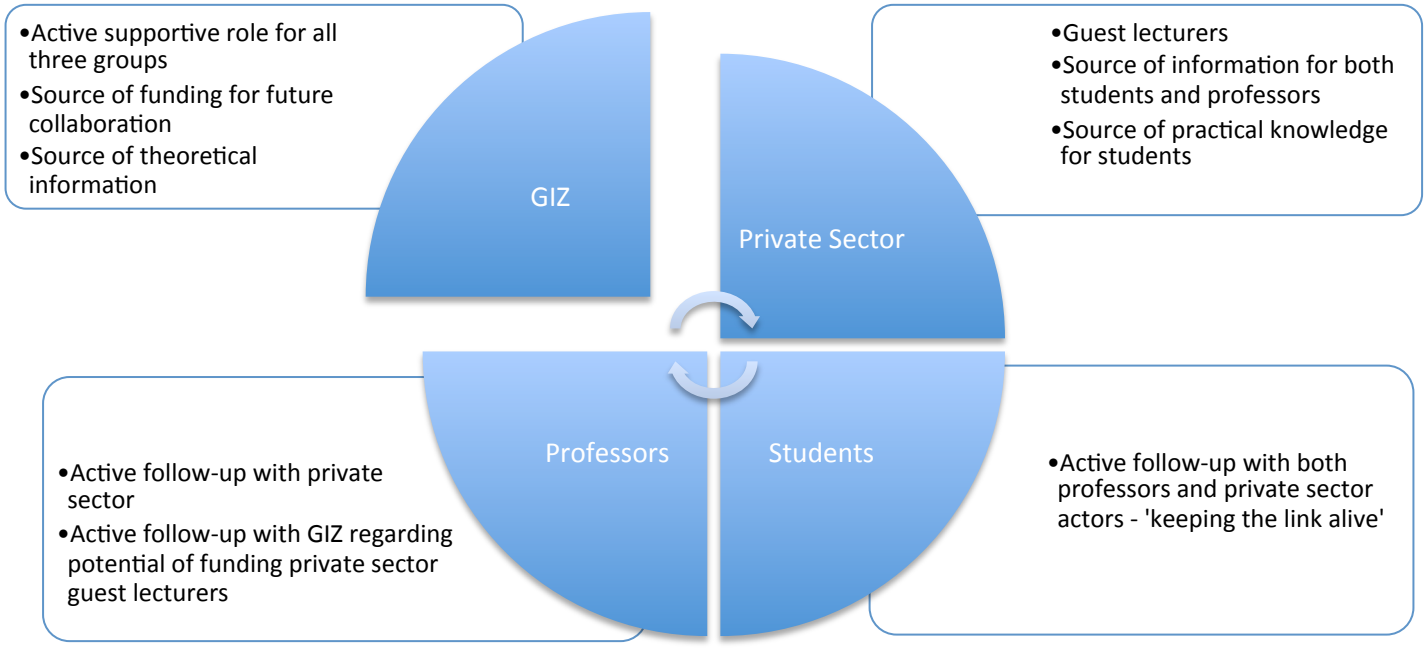
'These workshops bridge the gap between the private sector and Polytechnic University'.

5. CONCLUSION AND RECOMMENDATIONS

The development of the Afghan mining sector will still take years to come, and the obstacles to its *proper* development are plentiful on all levels:

- **Public Sector**: The Government of Afghanistan, represented through the MoMP in the mining sector, lacks not only the capacity to proper monitor mining activities, but also the necessary enforcement to curb the corruption and illegal activities currently dominating the extraction of natural resources in Afghanistan.
- **Private Sector**: Although there are currently dozens of active mining sites in Afghanistan, only a very small part is being explored and extracted legally with adequate technological means and skill. A viable development of the sector requires technological standardisation in order to result in the establishment of a vibrant mining labour market.
- **Academic Sector**: Last but not least, there is a large gap between the skills students possess and the skills demanded in the Afghan mining sector. Due to the shortcomings in theoretical and practical education at both the TVET and higher education level, Afghan youth are unprepared to meet the demands of the private sector.

Support is often focused on the best students of a class, which neglects a large student body that is equally willing to improve their education. As one student put it: 'When we learned that our classmates are going to Iran for internships, we became very sad. Why were we not allowed to go there? These workshops made us really happy, because it showed to us that GIZ wants to help all of us, not only the best of us'. For a thorough improvement of education for all, assistance cannot only be targeted to the best students but needs to include *all* students. The success of the workshops developed for this study and the satisfaction among professors, private sector representatives and students have shown that there is a strong need for a direct link between the private and academic sector in Afghanistan. Professors are unable to properly prepare their students for the realities of working in the mining sector as they are, for the most part, lacking any practical experience themselves and thus are completely disconnected from the realities on the ground. The willingness shown by all parties involved to actively and jointly bridge the gap between theoretical and practical education suggests that there is a self-sustaining drive behind this type of collaboration likely to last even after this research project has ended.



Several possibilities on how to continue strengthening the link between the private and the academic sector exist:

- *Guest lectures*: The workshops that took place at the companies are easily transferrable into the classrooms at Kabul Polytechnic University in the forms of guest lectures. This would familiarise students more and more with the skills demanded from them after graduation. Outside funding may be required, as private, profit-oriented actors realistically cannot be expected to continue working pro bono.
- *Workshops as part of curriculum*: Additionally, practical training can be made an inherent part of the curriculum for geology and mining engineering students. To ensure the interplay between both theory and practice and workshops which enrich and compliment students' knowledge at the same time, the involvement of both technical experts (Freiberg University, Polytechnic University) and practitioners from the field is needed.
- *Internships*: Due to the state of the sector, there is a current lack of capacity for interns. However, all interviewed companies had had interns in the past and are willing to offer such positions in the future once the economic climate permits them to do so. Keeping a constant flow of information between both the private and academic sectors will more easily allocate supply and demand once the economic situation of the sector has improved.
- *Regular Roundtable Discussions*: The establishment of regular roundtable discussions can serve as a source of informal knowledge exchange between academics and private stakeholders.

Establishing a fruitful and long-lasting partnership between the private and the academic sector will require the active collaboration of all parties involved. Their individual roles are explained in more detail below:

GIZ: GIZ needs to show active support to keep the newly established link between both sectors persistent and strengthen it over time. During the early stages, the support should mostly revolve around institutionalising the most important aspects of such a cooperation, i.e. facilitating dialogue that discusses the inclusion of guest lecturers and workshops in the curriculum of Kabul Polytechnic University. Holding regular roundtable discussions and inviting representatives from the MoMP and MoHE will be a first step into this direction. Furthermore, GIZ is the link between Freiberg University and Kabul Polytechnic University that ensures the technical support of Afghan professors in mining related fields.

Professors: Every initiative can only be as strong as the support it gets. Participating partners of the roundtable discussion have clearly stated their support for cooperation between Afghan universities and the private sector to increase the practical education of Afghan students in mining-related fields. In this respect, professors play the role of the connecting link between the private and sector and their students. Only with their active engagement in following-up with the private sector for technical input (i.e. in terms of guest lectures, internship programs or trainings) or appealing to supporting institutions for either financial input (international donors) or organisational support (i.e. MoHE) can this collaboration be fruitful.

Private Sector: During both roundtable discussions and trainings, partnering companies have signalled their willingness to actively support the improvement of education in mining-related fields. Apart from the students themselves, the private sector will be the biggest beneficiary of well trained national staff and should hence not only be a source of practical knowledge for academic institutions but also a source of information for both professors and students. Their advice and guidance will be vital in shaping Afghan mining education to a market-driven approach.

ANNEX A. Candidates for a Strategic Partnership

Private sector

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1.	Mr.Hadi Mohammadi	Yasamin	0789442012 0799327268	info@yasminlab.com, kabirzay@yahoo.com
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6.	Mr. Jafari / Akhlaqi	Afghanite	0700283942 0784421299	mhakhlaqi@afghanite.net jafari@afghanite.net
7.	Mr. Khudadadi	Pamir Mining	0775 729 165	pamir.geotechnical@gmail.com / khodadadi@pgs.af m_khodadadi83@yahoo.com
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10	Dr. Salim Karim	Mar Mar Bakhtar	0797777401	Mbc_afg@yahoo.com
10.	Esmat Gulistani	FSA	0799030800 0797719891	eg.marmaristan@gmail.com

Academic Sector

No	Name	Company	Phone #	Email address
1	Mr. Mosazai	Polytechnic University	0795863132	mosazai@gmail.com
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3	Ghulam Hazrat Askarzada	Kabul University/ OGC	0779524757	Ghulam.hadesa@gmail.com g/askarzada@ogc.af

Annex B. Company Profiles

	Afghanite	OGC	Pamir	Amania	Geo Search	Yasmin Co.	Afghan Marble Association	Qasimi Group	Ghazanfar	MCC
Headquarter	Kabul with a branch in Mazar	Kabul, it is a shareholder company with branches in Turkey, Dubai, USA	Kabul	Kabul with branches in Kandahar, UAE, and Karachi	Kabul	Mazar-e-Sharif	Most of the marble companies have their headquarter in Kabul and Herat	Afghanistan with other branches in Europe, UAE, US, Turkey	Afghanistan	Beijing with a local office in Kabul
Type of activities	Geotechnical, mining and environmental studies, ore deposit modelling/ Mapping, mineral processing	Offers professional consultancy Services for infrastructure, mining and environmental projects	Pamir is a consultancy firm offers services in geo-technical, geo physics, geo hydrology, laboratory testing, survey and topography services	Engaged in the exploration, development, mining and processing of industrial minerals and non-ferrous metals for the global market.	Geotechnical and geo physical studies, laboratory work	Exploration, exploitation, laboratory work, feasibility studies.	Exploration, exploitation, extraction and processing of marble stones all can be done in Afghanistan		Testing, seismic testing and drilling	Exploration And Extraction
Specialized activities for mining sector	Mining exploration, data mapping, drilling operation, and early stage operations: soil surveys and outcrop evaluations, and quarry operations.	Mine management consultation, reserve estimation, pre-feasibility and feasibility studies, geotechnical and geological surveys, geophysical and geo-hydrological surveys, topography, and environmental studies. The company also offers consultation on methods of extraction both for open-pit and underground	Geotechnical, mining exploration and extraction, geophysical, hydrology investigation and engineering survey services.	Mostly engaged in the exploration, study and exploitation of fluorite deposits in Afghanistan		Silica sand mind exploration and exploitation, EIA studies, feasibility studies	This sector is the most promising mining sector in Afghanistan. New technologies have been imported to exploit the mines more professionally.		Work mostly on petroleum: exploration, testing, seismic testing, drilling and exploiting, and extraction. Also build refineries and import crude oil.	MCC is an international company based in Beijing. They won the right to explore the Mes-Aynak Copper deposit. Mes-Aynak cooper is the second largest copper reserve in the world.

		mining								
Number of Employee	20+ employees.	Used to be 120, but has been reduced to 40 due to lack of projects		350 Afghan employee + 13 international employees			Almost 50,000 people are employed in the whole sector	300 employees in Afghanistan. Most of the employees are from neighbouring countries	25 employees during testing phase, 10 Turkish expats. Will increase to 500 during drilling phase and potentially much more during extraction	130 Afghans, 30-35 Chinese. Employed 300 Afghans before the project came to a halt
Mining activities	Testing samples, exploration studies, training	No direct contract with MoMP, but assist companies on the following mines: Field investigation for the Qarazaghan gold mine, lab activities for marble stones in Jalalabad and lab agtivities for granite in Bamyan.	Geological map of Kotal-e Onay Marble mine, exploration and exploitation of some other mines, training for ministry employees	Carries out mostly extraction activities, currently owns a Fluorite mine contract in Kandahar (Bakhud Fluorite deposit). The deposit encompasses 8.8 million metric tons of fluorite.	Mostly studies for mining, tunnels, dams road projects. Also active in the marble sector.	They own the right for exploitation of a sand silica mine in Mazar-e Sharif. They do mostly laboratory work and trainings.	Many new contracts have been signed to extract and process Afghan marble		Ghazanfar Investment Ltd. in consortium with Dragon Oil, Kuwait Energy and TPAO have been selected by the MoMP as the winner for the exploration and development of the Afghan-Tajik Basin.	In Afghanistan, the company won the contract to explore and exploit the Mes-Aynak cooper deposit. Negotiations stalled.
Type of employees	All Afghans	Mostly Afghans, foreign technical experts depending on the project	Only Afghan employees,	Mostly Afghans and foreign technical experts	Mostly Afghan employees, foreign technical experts for short periods.	Both Afghan and foreign staff. Afghans work in chemical technology and geology engineering and architectural engineering. International staff are hired for geological work and business development activities	Mostly Afghan, only very few foreign staff	Afghans and employees from neighbouring countries.	Afghans and Turkish expats	Mostly Afghans and Chinese technical experts

Annex C. References

Afghanistan Analysts Network (2014): "Takhar gold mine contract seen as illegal", https://www.afghanistan-analysts.org/miscellaneous/recommended-reading/takhar-gold-mine-contract-seen-as-illegal/ (June 8th, 2016).

Afghanistan Geological Survey: www.bgs.ac.uk (June 8th, 2016).

AISA 2012: A comprehensive study of marble industry in Afghanistan.

Daily Outlook Afghanistan (2016): "Daud Shah Saba Resigns as Mines Minister", http://outlookafghanistan.net/national_detail.php?post_id=14826 (June 8th, 2016).

Doclecture (2015): New Marble-Processing Facility Inaugurated at Marble Conference Opening, http://doclecture.net/1-9210.html (June 8th, 2016).

Fishstein, P. / Amiryar, M. E. (2015): Afghan Economic Policy, Institutions, and Society Since 2001. For the United States Institute of Peace.

Ghanizada (2014): "SAIL-led Indian consortium's bid for Hajigak irone not compliant", http://www.khaama.com/sail-led-indian-consortiums-bid-for-hajigak-irone-not-compliant-6569 (June 8th, 2016).

Integrity Watch Afghanistan (2015): The Plunderers of Hope? Political Economy of Five Major Mines in Afghanistan

Lipow, J. / Melese, F. (2011): Economic and Security Implications of Afghanistan's Newly Discovered Mineral Wealth; in: Defense & Security Analysis, Routledge Taylor & Francis Group.

Mohammdi, Z. (2015): „Over 2,000 Illegal Mining Sites in Afghanistan"; http://www.tolonews.com/en/business/20176-analysts-over-2000-illegal-mining-sites-in-afghanistan (June 8th, 2016).

Motevalli, G. (2010): "Afghanistan sees great white hope in marble sector", http://www.reuters.com/article/us-afghanistan-marble-idUSTRE63K00C20100421 (June 8th, 2016).

Najafizada, E. (2015): "The Taliban is Capturing Afghanistan's USD 1 Trillion in Mining Wealth", http://www.bloomberg.com/news/articles/2015-10-20/taliban-winning-race-to-capture-1-trillion-afghan-mining-riches (June 8th, 2016).

Noorzoy, S. (2014): "Afghanistan's Wartime Economy (2001 – 2014). The Devastating Impacts of IMF – World Bank Reforms", http://www.globalresearch.ca/afghanistans-wartime-economy-2001-2014-the-devastating-impacts-of-imf-world-bank-reforms/5393141 (June 8th, 2016).

O'Donnel, L. (2014): "New Afghan mining law lacks transparency, say experts", http://www.scmp.com/business/commodities/article/1579556/new-afghan-mining-law-lacks-transparency-say-experts (June 8th, 2016).

Risen, J. (2010): "U.S. identifies vast mineral riches in Afghanistan", http://www.nytimes.com/2010/06/14/world/asia/14minerals.html?_r=0 (June 8th, 2016).

Samuel Hall (2015): Shaping Afghanistan's Natural Resource Strategy – A National Stakeholder Engagement. For the Ministry of Mines and Petroleum (MoMP), commissioned by ASI and DfID.

Samuel Hall (2014): Peace and Conflict Assessment for the AMEA Programme. For GIZ.

Samuel Hall (2013): Mining Sector Social Impact Study. For the World Bank.

Sheffer, J. (2014): "Mining for minerals worth USD 3 trillion in Afghanistan", http://www.khaama.com/mining-for-minerals-in-afghanistan-4028 (June 8th, 2016).

Sigar (2016): Afghanistan's Oil, Gas, and Minerals Industries: USD 488 Million in US Efforts Show Limited Progress Overall, and Challenges Prevent Further Investment and Growth.

Sigar (2015): Afghanistan's Mineral, Oil, and Gas Industries: Unless U.S. Agencies Act Soon to Sustain Investments Made, USD 488 Million in Funding is at risk.

World Bank: World Development Indicators, http://databank.worldbank.org/data/reports.aspx?source=2&country=AFG&series=&period= (June 8th, 2016).

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