Perceptions on Knowledge Transfer Effectiveness in Multinational Corporations within the Renewable Energy Industry in South Africa

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DECLARATION

I, Asante Phiri, declare that this research article is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the Graduate School of Business Administration, University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Asante Andrew Phiri

Signed at Johannesburg

On the 20th day of May 2022

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ABSTRACT

The purpose of this quantitative study was to examine how employees working in multinational companies in the South African renewable energy industry, specifically those working for companies participating in the Renewable Energy Independent Power Producer Programme (REIPPP), experience and perceive the knowledge transfer initiatives of their companies and the effectiveness thereof. The REIPPP has a strong prevalence of multinational companies and one of its goals is the transfer of skills. With the application of knowledge identified as a precursor to the development of skill and multinational companies identified as vehicles for knowledge transfer, the study investigates the effectiveness of knowledge transfer within the REIPPP.

A survey questionnaire was used to assess the degree to which the elements identified by seminal models and as critical success factors for knowledge transfer were applied by multinational companies in the renewable energy industry in South Africa. Exploratory statistics techniques and regression analysis was used to identify relationships and verify expected relationships between critical factors and the benefits of as well as satisfaction with knowledge transfer.

The findings indicate that multinational companies within the REIPPP apply the knowledge transfer practices aligned with the critical success factor identified in knowledge transfer literature. Respondents predominantly had positive views of all aspects of the strategies, processes and systems used in the transfer of knowledge. Most respondents were satisfied with and identified the benefits of their company's knowledge transfer initiatives, 65.98% and 69.01% respectively. Critical success factors that negatively affect knowledge transfer were found to be largely overcome within the industry resulting in negligible effect on the satisfaction with and benefits of transfer. Potential areas for improvement were identified based on analysis of respondent responses. Improvement areas include the periodic assessment of knowledge transfer program effectiveness by multinational companies, as well as the encouragement and monitoring of transfer effectiveness by government programme sponsors.

Keywords: knowledge transfer, multinational, critical success factors, REIPPP

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1 INTRODUCTION

The purpose of this quantitative study was to examine how employees working in multinational companies in the South African renewable energy industry, specifically those working for companies participating in the Renewable Energy Independent Power Producer Programme (REIPPP), experience and perceive the knowledge transfer initiatives of their companies and the effectiveness thereof.

The South African renewable energy industry has a significant presence of multinational companies. Within the renewable energy industry, the South African Government's Renewable Energy Independent Power Producer Programme (REIPPP) seeks to create the benefit, amongst other benefits, of bringing in new skills to the market (South African Government, 2021).

Whilst the difference between knowledge and skill is well known and it is generally clear that knowledge alone does not lead to skill, it has been argued that knowledge and the correct attitudes in the application of the knowledge precedes skill (Varughese & D'Silva, 2018; Ferris, Von Guten, & Emanuel, 2007). Hence in order for skills to be developed knowledge must be transferred (Varughese & D'Silva, 2018) from its source to the recipient and the recipient must internalise the knowledge as the basis on which skills can be developed (Ferris, Von Guten, & Emanuel, 2007).

One distinguishing characteristic of multinational companies is their ability to transfer knowledge (Peltokorpi, 2015 ; Pedersen, Petersen, & Sharma, 2003). In their paper on knowledge transfer within organisations, titled "Knowledge Transfer: A Basis for Competitive Advantage in Firms", Argote & Ingram (2000) highlight the importance for multinational companies to transfer knowledge to their foreign subsidiary. Knowledge, itself, within multinational organisations has also been recognised by researchers as a means for the multinational companies to establish and maintain a competitive advantage (Jasimuddin, Li, & Perdikis, 2019; Peltokorpi, 2015; Nonaka, 2000, as cited in Rahman & Mohd Shamsul Mohd, 2017).

Research has also identified critical success factors and models for succesful knowledge transfer initiatives within multinational companies (Chini, 2004).

The problem statement for this research was framed as follows. Multinational companies have the propensity to transfer knowledge to their local subsidiaries (Peltokorpi, 2015). There is however little identified literature that examines the effectiveness of knowledge transfer from multinational parent companies to their local subsidiaries in the South African renewable energy industry under the REIPPP. Specifically, there is little literature that examines if knowledge transfer is occurring, the mechanisms through which that knowledge transfer is happening, the benefits of that knowledge transfer and the alignment of knowledge transfer practices in the South African renewable energy industry with best practices through the application of critical success factors for knowledge transfer. Furthermore, there is little identified literature that examines the views of local subsidiary employees' perceptions of the knowledge transfer efforts of their parent company. Considering the above, this research sought to understand two objectives. Firstly, to determine the experiences and perceptions of the local subsidiary employees regarding knowledge transfer. Secondly, to determine the applicability of critical success factors for and seminal models of knowledge transfer to the transfer present in multinational companies under the REIPP.

The context of the South African renewable energy industry is important for two reasons. Firstly, the renewable energy industry will develop more as the South African government increases capacity for renewable energy generation (Eskom, 2020 ; South African Government, 2019), as such it was important to understand if local employees were being given a chance to acquire new knowledge through knowledge transfer. Secondly, the major competitors in the industry are multinational corporations (Eberhard & Naude, 2017; GreenCape, 2021) and there was need to understand if there were benefits of knowledge that were being realised as part of the renewable energy tenders.

The significance of the research is to contribute the knowledge base on knowledge transfer within this industry and sector. This could be of use to stakeholders of the Renewable Energy Independent Power Producer Programme, and similar government programs, that have substantial involvement of multinational companies with local subsidiaries (Eberhard & Naude, 2017; GreenCape, 2021) and where knowledge transfer is one of the goals of the program.

The study was delimited to the multinational companies in the renewable energy industry, specifically those participating in the Renewable Energy Independent Power Producer Programme in South Africa and the employees that work at or have previously worked at those companies' subsidiaries in South Africa.

A key assumption of the study was that the perceptions and experiences of employees provide a reasonable proxy of the status of knowledge transfer initiatives within the industry. In this study the knowledge transfer was not examined directly with the multinational company but through the experiences and perceptions of the employees.

2 LITERATURE REVIEW

The literature review provided the theoretical background, prior research findings and context of the research. The study was contextualised by exploring the definition and importance of multinational corporations in general as well as their prevalence within the South Africa renewable energy industry, specifically in relation to the Renewable Energy Independent Power Producer Program. The literature review then proceeds to cover the overarching frameworks and value chains of knowledge management before proceeding into knowledge transfer, a subsection of knowledge management (Shongwe, 2016). Within knowledge transfer, the literature review expands on the definitions, benefits, and related transfer mechanisms before identifying the critical success factors and impeding factors. Lastly a conclusion is provided for the entire literature review to summarise and conclude on the findings of the literature review.

2.1 Multinational Companies within the Renewable Energy Industry in South Africa

A multinational company is a firm that transfers knowledge by operating in a foreign country and maintaining control of the entity in the foreign country (Kogut & Reuben, 2015). Firms can be classified as multinational companies if they have significantly directly invested in a foreign country and are actively involved in the management of these foreign investments with the investments reporting to the head office (Bartlett &Ghoshal, 1989, as cited in Chini, 2004).

The Renewable Energy Independent Power Producer Programme (REIPPP) is a subset of South Africa's Independent Power Producers Procurement Programme (IPPPP) that is focused on the procurement of energy from renewable sources such as wind, small hydro, and biomass (South African Government, 2021). As at March 2021, foreign equity, and financing under the REIPPP totalled R41.8 billion (Independent Power Producers Procurement Programme, 2021) thereby indicating substantial foreign investment in the sector.

There is a is a substantial prevalence of multinational companies within the REIPPPP as evidenced by past industry complaints regarding multinational corporation dominance (Eberhard & Naude, 2017) as well as a review of the REIPPP's first three bid windows indicating that the main equipment suppliers were foregn multinational companies (Eberhard, Kolker, & Leigland, 2014). During the operational phase of the project multinational companies the equipment supplier tended to also stay on as operations and maintenance service providers (GreenCape, 2021). As of 2019, thirty one of the eighty-seven members listed on the South African Wind Energy Association's (South African Wind Energy Association, 2019) website could be identified as subsidiaries of multinational companies. Similarly, thirty-four of the one hundred and thirty-eight members of the South African Photovoltaic Association's (South African Photovoltaic Industry Association, 2021) are multinational subsidiaries.

2.2 Knowledge Management Frameworks

Knowledge management frameworks, models that describe interrelated processes, instruments and systems (Pawlowski, 2013), have been used within organisational context to provide understanding of cultural patterns (Bhagat, Kedia, Harveston, & Triandis, 2002), identify traits that explain processes within knowledge management (Ward, House, & Hamer, 2009), as well as to provide common terminology, structure and understanding (Pawlowski & Bick, 2012). Pawlowski & Bick (2012) have also noted the importance of knowledge management frameworks as a means of identification of research gaps (Alavi & Leidner, 2001; Grover & Davenport, 2001 as cited in Pawlowski & Bick, 2012).

The literature provides many knowledge management frameworks as evidenced by a review of around one hundred and sixty by Heisig (2009) and twenty-eight by Ward, House, & Hamer (2009). Whilst some frameworks highlight business processes and the interaction with the surrounding environment (Pawlowski & Bick, 2012; Meher & Mahajan, 2016), Shin *et al.* (2001) provide a useful conceptualisation of the role of knowledge transfer within a knowledge management framework, reffered to as the Knowledge Management Value Chain (Shin, Holden, & Schmidt, 2001), as illustrated in Figure 1.

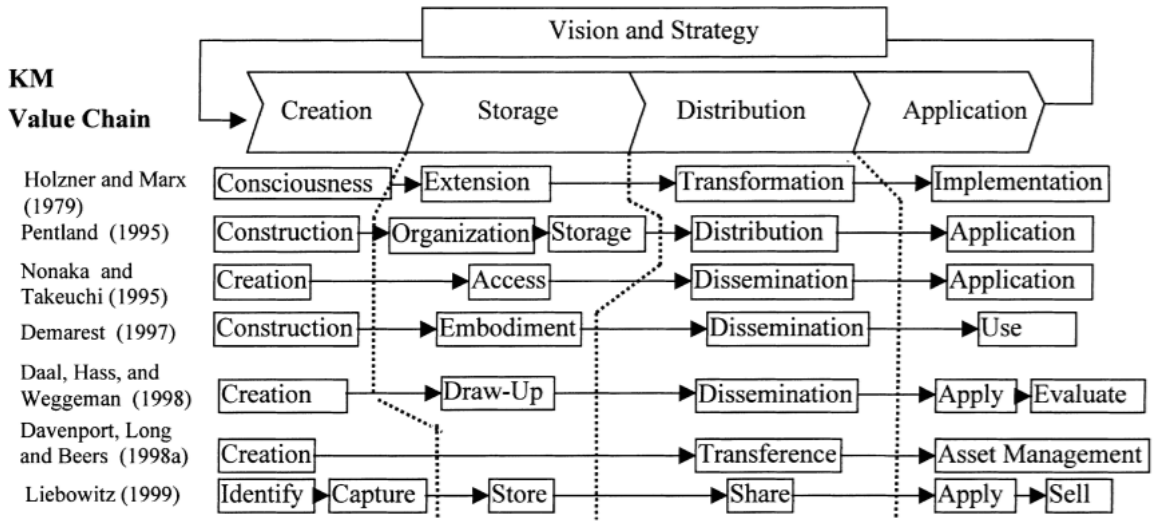

Figure 1: Knowledge Management Value Chain (Shin, Holden, & Schmidt, 2001)

The Knowledge Value Chain, based on review of prior research, demonstrates that organisational knowledge transfer forms part of a sequence in which knowledge is created, stored, distributed, and then applied with an overarching vision and strategy governing the process (Shin, Holden, & Schmidt, 2001). The model also highlights that knowledge transfer is referred to in different ways but ultimately involves the intermediate step between the storage of knowledge and the use or application of the knowledge (Shin, Holden, & Schmidt, 2001).

2.3 Knowledge Transfer

Knowledge transfer refers to the distribution of knowledge between a source where the knowledge is stored and a user or receiver of the stored knowledge (Shin, Holden, & Schmidt, 2001). The flow in the transfer of knowledge can be from source to recipient as noted by Shin *et.al*. (2001) but this can also extend to a transfer from initial recipient to the initial source in a process known as reverse knowledge transfer (Dobra, Farkas, Karoliny, & Poór, 2012). The reciprocal nature of knowledge transfer was also found by Bresman et al. (1999) in their case study data analysis study on international firm acquisitions in which the evolution of knowledge transfer process over time from a one way transfer to a reciprocal transfer was noted between acquiring firms and the acquired firm (Bresman, Birkinshaw, & Nobel, 1999) . Expansions of the definition of knowledge transfer include intergroup, interdepartmental, and interdivisional experience sharing (Argote & Ingram, 2000); and cognitive mental constructs and skills are also found in literature (Chini, 2004). Of critical importance, they indicate that organisational knowledge is created, stored, distributed, and applied all within the organisation's overarching vision and strategy (Shin, Holden, & Schmidt, 2001). Knowledge transfer is hence a process and area of study that emanates from the concept of the distribution of knowledge within the knowledge management frameworks.

2.4 Knowledge Transfer Benefits

Some researchers have highlighted that organisational knowledge represents a key and sustainable competitive advantage (Peltokorpi, 2015 ;Dobra, Farkas, Karoliny, & Poór, 2012 ; Rahman & Mohd Shamsul Mohd, 2017 ; Argote &

Ingram, 2000) through which firms can introduce new products and services to increase the value of management and the firm (Miśkiewicz, 2018). The success of organizations is linked to its capability to easily distribute the knowledge created throughout the organisation, although it is noted that this does not guarantee success (Pedersen, Petersen, & Sharma, 2003). Further to competitive advantage, Rahman *et al. (*2017) note the importance of knowledge management and transfer to improve organisational innovation, decision making and ultimately performance (Rahman & Mohd Shamsul Mohd, 2017).

There is substantial monetary value for firms to ensure adequate knowledge transfer practices, Babcock (2004) highlighted an estimated annual loss in excess of thirty one billion dollars amongst Fortune 500 companies due to the inadequate knowledge transference (Babcock, 2004 as cited in Vlajic *et al*, 2019).Dobra et al. (2012) noted that the subsidiaries also benefit from knowledge transfer because of the opportunity it affords them to increase their importance and positioning in the organisation with the caveat that the parent company would share this knowledge to its own benefit (Dobra, Farkas, Karoliny, & Poór, 2012).

Hence, several benefits are noted for the transfer of knowledge within multinational organisations, these include monetary benefits (Babcock, 2004 as cited in Vlajic et al, 2019), competitive advantage (Nonaka, 2000, as cited in Rahman & Mohd Shamsul Mohd, 2017), improved innovation and decision making (Rahman & Mohd Shamsul Mohd, 2017) as well as a means to ensure success for the organisation (Pedersen, Petersen, & Sharma, 2003).

2.5 Knowledge Transfer Mechanisms

Within knowledge management there is a distinction made between tacit and explicit knowledge (Nonaka, 1994), although Polanyi (1966) argues that all knowledge contains both elements (Polanyi 1966, as cited in Chini, 2004). Tacit knowledge refers to knowledge that is personal, interna to individuals, cognitive, subjective, and based on learning and experience whilst explicit knowledge is objective, externalised, and structured (Virkus, 2014). Researchers have defined

several other types of knowledge such as implicit knowledge (Nickols 2000, as cited in Virkus,2014), declarative, procedural, causal and relational knowledge (Zack 1999, as cited in Virkus,2014), human, social and structural knowledge (DeLong & Fahey 2000, as cited in Virkus,2014) as well as substantive and entrepreneurial knowledge (Aguayo 2004, as cited in Virkus,2014) however tacit and explicit knowledge represent the major knowledge types in knowledge management (Virkus, 2014).

Tacit knowledge can be codified into explicit knowledge and this codification into explicit knowledge allows for the transfer of the knowledge with the caveat that codified proprietary firm information is always at risk of uncontrolled dissemination (Pedersen, Petersen, & Sharma, 2003). Nonaka (1994) provides a model in which tacit and explicit knowledge can be interchanged in four ways. The first of these, Socialisation, refers to the transfer of tacit knowledge in an individual to another individual's tacit knowledge. The second, Externalisation, describes the conversion of tacit knowledge to explicit knowledge. Combination, the third, is an interchange of explicit knowledge from an explicit source to an explicit destination. Lastly, Internalisation describes the process of turning explicit knowledge into tacit knowledge with the individual (Nonaka, 1994).

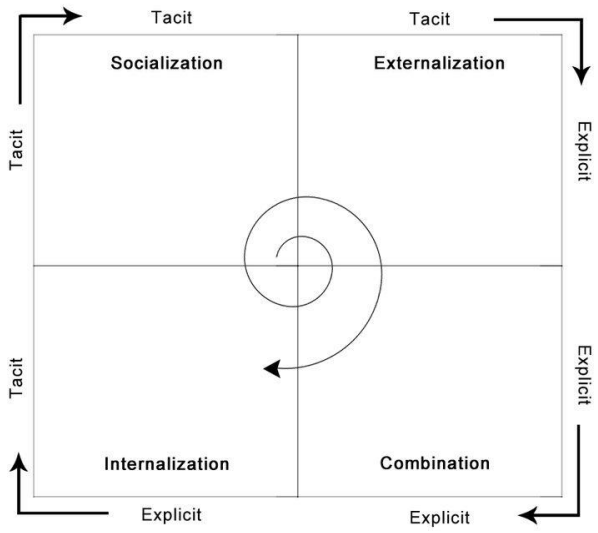

Figure 2: Nonaka (1994) Modes of Knowledge Creation

The use of the right transfer mechanisms is important as the incorrect method results in lost knowledge and ultimately potentially results in a poor result for the organisation's performance (Pedersen, Petersen, & Sharma, 2003). Nunes &Simion (2014) also highlight the importance for multinational companies to develop strategies and identify transfer mechanisms for the dissemination of knowledge to subsidiaries whilst noting that human capital development, investment in information systems and incentives for people transfering knowledge are an important factor (Nunes & Simion, 2014).

In their research into the knowledge transfer performance of multinational companies, Pedersen et al. (2003) noted that managers in multinational companies are responsible for ensuring a proper fit between the type of knowledge to be transferred and the mechanism or medium through which to affect the transfer. Two types of mechanisms were identified: namely Rich Communication Media and Written Media (Pedersen, Petersen, & Sharma, 2003). Rich communication media refers interactions at a face-to-face level or within team-based settings or informal settings whilst written media refers to documented knowledge or databases that can be disseminated across the organisation. Consequently, tacit knowledge is best transferred through rich communication media whereas explicit knowledge is best transferred using written media (Pedersen, Petersen, & Sharma, 2003). Organisational knowledge is often in its databases (Mazorodze & Buckley, 2020), documents, processes as well as routines and norms (Davenport, 1998, as cited in Chini,2004). Pawloski & Bick (2012) collated knowledge transfer mechanisms from literature to identify human-based mechanisms and technology-based mechanisms. Human-based mechanisms included activities such as mentoring, team development, career planning as well as job rotations whilst technology-based mechanisms included documentation management, messaging, and videoconferencing (Pawlowski & Bick, 2012).

Expatriates play a vital role in the dissemination and interpretation of knowledge (Nunes & Simion, 2014; Jackson & Horwitz, 2017), especially tacit knowledge, from the parent organisation to the local subsidiary whilst also identifying new

knowledge in the subsidiary (reverse knowledge transfer) (Dobra, Farkas, Karoliny, & Poór, 2012). Expatriates are able to play this role as a substantial amount of the knowledge available within organisations is tacit knowledge within its members (Argote & Fahrenkopf, 2016). The choice of knowledge transfer mechanisms is highly dependent on the type of knowledge to be transferred (Pedersen, Petersen, & Sharma, 2003).

Though there are several types of knowledge identified in literature (Virkus, 2014), the most frequent distinction of knowledge types identified in the literature review is that of tacit and explicit knowledge with tacit knowledge being internal to individuals and explicit knowledge being external and documented (Nonaka, 1994 ; Virkus, 2014). Polanyi (1966) argues that all knowledge contains both elements (Polanyi 1966, as cited in Chini, 2004).

2.6 Effective Knowledge Transfer Critical Success Factors and Impediments

Critical success factors are defined as the individual events or activities that are required to ensure success (Rahman & Mohd Shamsul Mohd, 2017). Pawloski & Bick (2012) found several critical success factors for knowledge management as shown in Table 1.

Table 1: Pawloski & Bick (2012) knowledge management critical success factors

Context: Success factors	*Success factors for KM in organizations*	▪ *Integrated Technical Infrastructure* ▪ *Knowledge Strategy that identifies users, sources, processes, storage strategy, knowledge* ▪ *Clear knowledge structure* ▪ *Motivation and Commitment* ▪ *Organizational culture supporting sharing and use of knowledge* ▪ *Senior Management support including allocation of resources, leadership, and providing training* ▪ *Measures are established to assess the impacts* ▪ *Clear goal and purpose for the KMS* ▪ *Search, retrieval, and visualization functions* ▪ *Work processes incorporate knowledge capture and use* ▪ *Learning Organization* ▪ *Security/protection of knowledge*	*Maier (2007), Bick (2004), Fahey & Prusak (1998) Davenport & Prusak (1998) Lehner & Haas (2010)*

In his analysis of one hundred and sixty frameworks, Heisig (2009) identified four critical success factors for knowledge transfer in a general knowledge management context, not specific to multinational companies. The four critical success factors are human-oriented (inclusive of the culture, the leadership, and

its people), organisational (inclusive of the organisation's processes and structures), the technology infrastructure and applications and lastly, management's strategy and goals (Heisig, 2009).

Within knowledge transfer specific to multinational companies, several researchers have identified critical success factors for the successful implementation of transfer of knowledge from multinational companies to their local subsidiaries. Conversely the literature also notes factors that are impediments to the successful transfer of knowledge from multinational companies to their local subsidiaries. The difference in national cultures between the parent company country and the local subsidiary's country is one of the critical success factors noted (Dobra, Farkas, Karoliny, & Poór, 2012 ; Vlajcic, Caputo, Marzi, & Dabic, 2019). Clashing cultures between the parent company country and the recipient subsidiary country culture also impede the success of knowledge transfer and as such adjustments need to be considered when rich communication media is used to transfer knowledge (Pedersen, Petersen, & Sharma, 2003).

In addition to national culture, organisational culture is also indicated as one of the most important (Prasarnphanich, 2003) aspects for the success or failure of a knowledge transfer initiative (Dobra, Farkas, Karoliny, & Poór, 2012 ; Pedersen, Petersen, & Sharma, 2003 ; Rahman & Mohd Shamsul Mohd, 2017 ; Vlajcic, Caputo, Marzi, & Dabic, 2019 ; Argote & Ingram, 2000 ; Chini, 2004). To this extent, Vlajcic et al.(2019) identified the cultural quotient of expatriates an important factor in the effectiveness of the expatriate.

Cultural quotient is subdivided into cognitive cultural quotient (relating to knowledge of values, practices and beliefs), metacognitive cultural quotient (relating to one's awareness of the nuances of cultural interaction and one's ability to strategise and navigate cultural interactions), motivational cultural quotient (relating to one's motivation and interest to acquire knowledge of other cultures) and behavioural cultural quotient (relating to one's ability to appropriately adapt one's behaviour in cross cultural interactions) (Vlajcic, Caputo, Marzi, & Dabic, 2019). Cultural quotient is important for the interpretation of knowledge coded by

the multinational company with cognitive cultural quotient and metacognitive cultural quotient being the most important subsets of cultural quotient in the transferring of knowledge to the local subsidiary (Vlajcic, Caputo, Marzi, & Dabic, 2019).

The geographic locations of and distance between the multinational company and the local subsidiary are also identified as a critical success factor (Pedersen, Petersen, & Sharma, 2003 ; Vlajcic, Caputo, Marzi, & Dabic, 2019 ; Chini, 2004 ; Dobra, Farkas, Karoliny, & Poór, 2012) , whilst also noting that distance has an effect on the chosen transfer mechanism and the need for multinational organisations to implement a framework that can support the distance to its subsidiaries (Dobra, Farkas, Karoliny, & Poór, 2012). Geographic proximity is better (Pedersen, Petersen, & Sharma, 2003) and proximity in general will determine the level of face-to-face interactions and coordination versus technology-based coordination (Dobra, Farkas, Karoliny, & Poór, 2012).

The organisation’s strategy, its structure, and processes as well as technological infrastructure have also been defined as critical success factors for knowledge transfer in organisations (Rahman & Mohd Shamsul Mohd, 2017). Contextual similarity and personnel mobility are also identified as success factors for knowledge transfer (Argote & Fahrenkopf, 2016). Chini (2004) provides a comprehensive review of knowledge transfer within multinational companies and provides a model, illustrated in Figure 3, for effective knowledge transfer that highlights strategic mandate, value of the knowledge stock, cultural distance, organisational distance, transmission channels, infrastructure, and process capabilities as critical success factors (Chini, 2004).

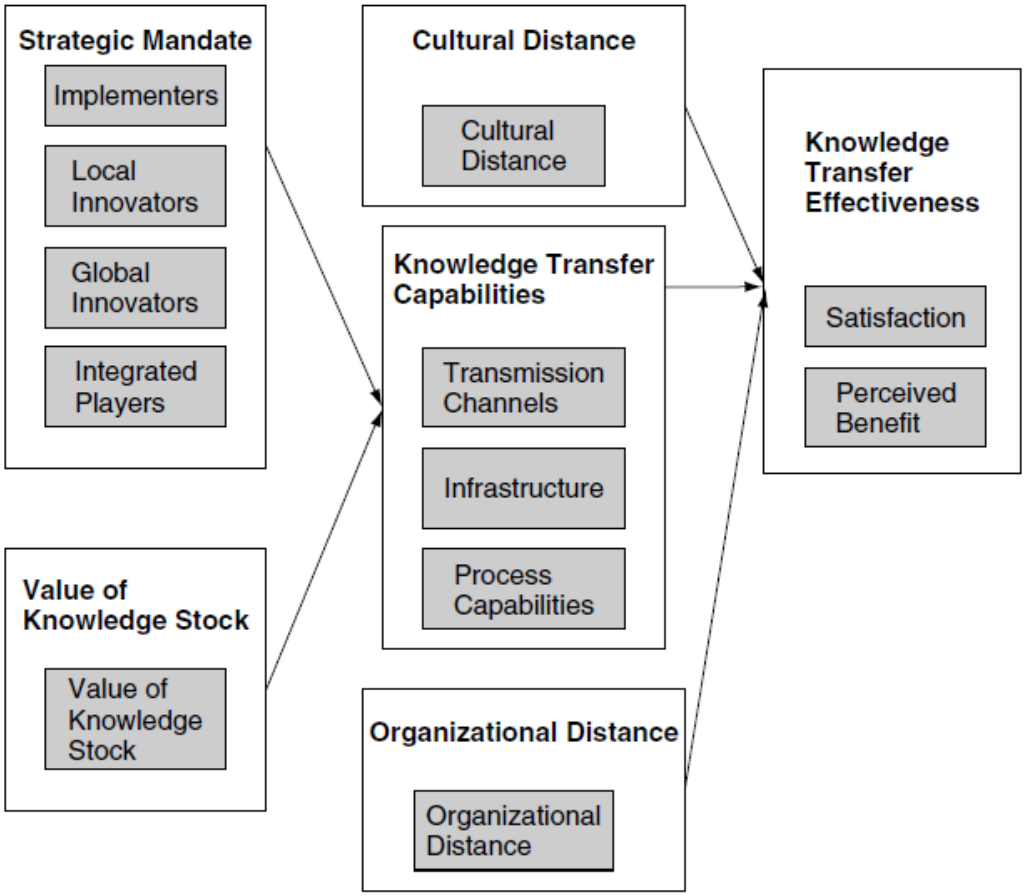

Figure 3: Chini (2004) Model for Effective Knowledge Transfer in Multinational Companies.

2.7 Research questions on knowledge transfer within South African renewable energy industry

Given the literature identified, the following research questions are posed relating to knowledge transfer in multinational companies in the South African Renewable Energy Independent Power Producer Program:

1. What are the experiences and perceptions of the local subsidiary employees regarding knowledge transfer?
2. Is there knowledge transfer occurring within the subsidiaries of multinational companies under the REIPP?
3. Is the knowledge transferred within subsidiaries of multinational companies under the REIPP valuable to the local subsidiary?
4. What are the transfer mechanisms used in subsidiaries of multinational companies under the REIPP?

5. What, if any, are the impediments to knowledge transfer in subsidiaries of multinational companies under the REIPP?
6. What is the perceived effectiveness of knowledge transfer in subsidiaries multinational companies under the REIPP?
7. What is the applicability of critical success factors for and seminal models of knowledge transfer to the transfer present in multinational companies under the REIPP?

To determine the knowledge transfer experiences and perceptions of employees in the South African renewable energy industry the following null hypothesis were formed to examine the knowledge transfer initiatives against established critical success factors and models identified in the research:

1. *H_0 – MNC employees feel that their parent companies have a strategic mandate to transfer knowledge to the local subsidiary*
2. *H_0 – The perceived level of strategic mandate to transfer knowledge to the local subsidiary has a positive effect on the perceived effectiveness of knowledge transfer.*

To test the perceived value of the knowledge within the parent company and its effect on the perceived effectiveness, the following null hypothesis were formed:

3. *H_0 – MNC employees feel that their parent companies have knowledge that is valuable to the local subsidiary*
4. *H_0 – The perceived level of parent company knowledge value has a positive effect on the perceived effectiveness of knowledge transfer.*

The perceptions regarding MNC knowledge transfer capabilities are tested through the following hypothesis:

5. *H_0 – MNCs in the South African renewable energy industry use different transfer mechanisms to transfer knowledge*

6. *H_0 – Expatriates in MNCs in the South African renewable energy industry are culturally adept and affect perceived knowledge transfer effectiveness positively*
7. *H_0 –MNCs in the South African renewable energy industry have processes and information systems that are perceived to positively contribute to knowledge transfer*

The perceptions regarding MNC organisational distance and cultural distances and their effects on perceived knowledge transfer effectiveness were tested using the following:

8. *H_0 – Employee perceptions of high cultural distance between parent company country and South Africa negatively affects perceptions of transfer effectiveness*
9. *H_0 – Employee perceptions of high organisational distance between parent company country and South African subsidiary negatively affects perceptions of transfer effectiveness*

The last hypothesis is used to test the overall fit of the Chini (2004) to the perceptions of knowledge transfer within MNCs in the South African renewable energy industry as follows:

10. *H_0 – The perceived effectiveness of knowledge transfer within the South African renewable energy industry can be represented by a regression model with independent variables Strategic Mandate, Knowledge Stock Value, High Cultural Distance, High Organisational Distance and MNC Knowledge Transfer Capabilities (*

2.8 Conclusion

The knowledge within multinational organisations has also been recognised by research as a means for the multinational companies to establish and maintain a competitive advantage (Jasimuddin, Li, & Perdikis, 2019; Nonaka, 2000, as cited in Rahman & Mohd Shamsul Mohd, 2017). As such knowledge must be managed

and within multinational companies it must be transferred to subsidiaries in order create a competitive advantage. Knowledge management frameworks provide an understanding of the different concepts, processes, and interactions within knowledge management. Whilst also providing a common understanding (Pawlowski & Bick, 2012) of the field and assisting in identifying research gaps, they describe the members, tools and tasks that form part of the interactions (Argote & Fahrenkopf,2016).

The literature review generally indicates that there are substantial benefits for multinational organisations to invest the time and resources required for knowledge transfer as it is generally beneficial for the organisation.

Having established the need and benefits of knowledge transfer within multinational organisations, knowledge transfer mechanisms provide an indication of how multinational organisations, as well as in organisations in general, can transfer knowledge to the subsidiaries. The preferred mechanism for the transfer of tacit knowledge is the personal interaction at a face-to-face level, individually or within team-based settings, also referred to as rich communications media (Pedersen, Petersen, & Sharma, 2003). In contrast, the preferred mechanism for the transfer of tacit knowledge is the dissemination of documentation and databases within the organisation and is referred to as written communication media (Pedersen, Petersen, & Sharma, 2003).

The literature highlights the use of expatriates as an important aspect in the use of rich communications media and the dissemination and interpretation of knowledge (Nunes & Simion, 2014) from the multinational corporation’s head office. Further reviews of the literature show that knowledge transfer researchers have in recent years focused on specialised topics within the field, moving away from general effectiveness and critical success factors, and that no studies were identified that have tested for effectiveness of knowledge transfer or the application of knowledge transfer critical success factors within the South African renewable energy industry.

As the literature review has identified a significant prevalence of multinational companies within the renewable energy industry in South Africa as well as the propensity of multinational companies to transfer knowledge to their subsidiaries, as well as in some cases gain new knowledge from the subsidiaries through reverse knowledge transfer, the study sought to understand the perceptions and experiences of local multinational subsidiary employees within the renewable energy industry in South Africa relating to the knowledge transfer between the multinationals and their local subsidiaries and benchmarked against critical success factors identified in the research.

3 METHODOLOGY

In the context of this study, the following elements and steps are highlighted in the following subsections.

3.1 Research Approach

Quantitative research, defined as research targeting objectives with the use of numerical measurements and analysis (Zikmund et al., 2009), was performed for the study. The choice for quantitative research was motivated by quantitative research's ability to provide good objectivity and universality (Basias & Pollais, 2018; Lee, 1992). In addition to increased objectivity, quantitative research allows for a systematic investigation of observations through statistics (Basias & Pollais, 2018). Quantitative research would hence provide an objective and universal view of the status of knowledge transfer within the South African renewable energy industry.

The underlying assumption within the study was that employee's perceptions and experiences of knowledge transfer within the renewable energy industry in South Africa are a proxy for the status of knowledge transfer practices by the

multinational companies. As such, quantitatively measuring those perceptions and experiences would provide an indication of practices in the industry.

3.2 Research Design

The selected basic research method was a survey questionnaire with questions designed to assess the degree to which the elements identified as critical success factors for knowledge transfer were applied by multinational companies in the renewable energy industry in South Africa. A quantitative approach was selected in order to be able to collect survey responses from multiple respondents and aggregate the responses and findings as a representation of the overall industry. The survey questionnaire employed a seven-point Likert-scale to describe the degree to which respondents experienced, had experienced, or perceived the application of the identified critical success factor. This approach allowed for the stated null hypotheses to be evaluated against the feedback from multiple respondents. A seven-point Likert-scale was chosen as it measures respondent predisposition and provides better reliability and user preference (Taherdoost, 2019).

In addition, general questions relating to demographics and qualification criteria were posed in the survey questionnaire. The purpose of these was to allow for a demographic understanding of the respondents and ascertain if there were any significant differences in responses according to the demographics as well as a means of measuring if there was adequate representation of multinational companies from different parts of the world within the final respondents. This was measured against the indications of the Independent Power Producers Procurement Programme (2021) reported indications of multinational company parent company origin.

For the current study, the advantage of this approach is that it allows for a more aggregated view of the industry by using multiple respondents' subjective experiences and perceptions to create a more objective aggregate indication of the application of the critical success factors.

For this study, the disadvantage of this approach was that it requires a substantial number of responses and diversity of respondents, in alignment with industry representation, to ensure that the results were representative of the industry.

3.3 Population

The population for the study was the employees, current and past, of multinational companies participating in the Renewable Energy Independent Power Producer Programme in South Africa. This population was chosen as the employees within a multinational company should have experience and perceptions on the application of knowledge transfer initiatives within the multinational company and should be able to provide adequate responses to the questions relating to the application of knowledge transfer critical success factors within the multinational companies. No credible data was available on the size of the population i.e., employees and former employees of multinational companies operating in the Renewable Energy Independent Power Producer Programme (REIPPP). The REIPPP has created 59 071 jobs since inception but the nature of some of these jobs has been temporary, during construction, and 12 435 of these have been permanent during operations (Independent Power Producers Procurement Programme, 2021). There is however no credible indication of how many of these have been in multinational corporations. Over a third (35.6%) of SAPVIA's members are identified as multinationals (South African Photovoltaic Industry Association, 2021). As there is no published figure of the population size, a reasonable estimation of 4 399 for the population size can hence be calculated as 4399, (using 35.6% multiplied by 12 435).

3.4 Sample and Sampling Method

Using the estimated 4399 for the population size, the sample size required for 95% confidence level and 5% margin of error size can be calculated at 354 (Ahmad & Halim, 2017). Reduction of the confidence level to 90% would yield a required sample size of 255 (Ahmad & Halim, 2017). Assuming a response rate of 75%, a sample size of 472 respondent will be targeted. An acceptable level of margin of error in organisational research is generally 5% but this could decrease or increased depending on the required precision (Ahmad & Halim, 2017).

Sample selection was based on non-probabilistic sampling based on access to an extended network in the renewable energy industry in South Africa. Data collection was conducted via an online survey questionnaire. The desired population was employees (current and former) of multinational companies that participate in the REIPPP. The online survey was sent to individuals identified as part of the desired population via their LinkedIn profile. There was no desired demographic of the sample except the origin of the multinational company parent company and an alignment of this with the reported origins of multinational companies by the Independent Power Producers Procurement Programme (2021). Participation was solicited through direct contact with and request of respondents via direct messaging, email, and other electronic communications.

3.5 Research Instrument

A survey questionnaire was used as the research instrument and captured in Appendix A. The survey questionnaire was designed with twelve questions. The first question serves as a filter to ensure that the respondent qualifies as part of the desired population. This question provided determined if the respondent works for or has worked for a multinational company. The second question is designed to provide data to test how well the overall sample is representative of the multinational companies in Renewable Energy Independent Power Producer Programme as reported by the Independent Power Producers Procurement Programme (2021). This question provides continental options for parent company origins. The remaining 10 questions in the survey were based on a seven point Likert-Scale with each question addressing one of the ten null hypothesis indicated.

3.6 Procedure for Data Collection

Data was be collected through emailing or direct messaging potential respondents a link to the online survey questionnaire. Potential respondents were identified via LinkedIn based on the indications on their profiles. This method was chosen as it allows easy access to potential respondents.

3.7 Data Analysis and Interpretation

Analysis was conducted using exploratory statistics techniques resulting in the findings that were interpreted for the final conclusions and reporting. Regression analysis (Denis, 2018) was employed to test the relationship between effectiveness of transfer with independent variables Strategic Mandate, Knowledge Stock Value, Cultural Distance, Organisational Distance and MNC Knowledge Transfer Capabilities. The choice of regression analysis and descriptive statistics was driven by the nature of the research questions.

Interpretation was based on the findings and critically discussed, concluded on, and reported.

3.8 Limitations of the Study

Limitations of the study that could influence the results included the biases and predispositions of the respondents and the relatively large number of respondents required for the sample. Another limitation was that the respondents need to be diversified enough, i.e., employees from as many different multinational companies as well as several employees from within the same multinational company, for the sample to be truly representative of the population and the chosen industry sector.

3.9 Reliability and Validity

Validity and reliability are two intertwined measures of the quality of research (Idris & Chan, 2017). Reliability measures the stability and consistency of a measurement process and can be measured using Cronbach's Alpha (Idris & Chan, 2017). A Cronbach's Alpha score of 0,8 and higher represents a very good level of reliability for a study (Idris & Chan, 2017). There are however differing views regarding acceptable levels of alpha, generally ranging from 0.7 to 0.95 (Tavakol & Dennick, 2011). Cronbach's Alpha was used to measure the reliability of this study.

Validity describes the degree to which a research instrument achieves its purpose and is subdivided into internal and external validity (Andrade, 2018). Internal

validity measures whether the design, execution and analysis provide for credible responses to the highlighted research questions and whether there are systematic errors in the design, execution, or analysis (Andrade, 2018). Andrade (2018) notes that internal validity is judged and not computed. External validity provides a measure of the generalizability of a study to other areas (Andrade, 2018).

Internal validity of this study was maintained through diligently referencing the aims and objectives of the study. External validity for this study is of little relevance as the study does not seek to be a generalised study capable of extension to other contexts.

3.10 Ethical Considerations

The study was conducted with informed and voluntary consent of the participants. Confidentiality and anonymity of the participants was also be maintained. No harm or ethical violations resulting from this study have been identified. The ethical guidelines and processes of the University of the Witwatersrand were adhered to.

4 ANALYSIS OF DATA AND INTERPRETATION OF RESULTS

This section presents the summary of the findings from the online survey. A total of 213 participants responded to the survey. The number of participants that completed the survey in full was 200, approximately 90% of the total participants. The following sections describe the data collected and the respondents' answers to the survey questions.

4.1 Descriptive Data for Survey Responses

The final survey data comprised of entries from 215 respondents. The first two questions in the survey were designed to provide a filtering mechanism to determine whether respondents were part of the target population, namely people

that work or have worked in multinational companies in South Africa in in the renewables industry under the REIPPP. The data was also filtered for missing and incomplete data. Due to the unrelated nature of the questions, there was no opportunity to fill in missing data based on answers from other questions. Hence responses from participants that did not complete the survey were discarded. A total of 27 participants did not complete the survey. A further 17 respondents completed the survey but indicated that their company did not have a holding or parent company that controlled the local entity and hence were excluded from the target population. The remaining data set consisted of 171 entries that were useable and represented the target population.

The geographic origin of the respondents' holding companies is shown in Figure 4 below. Most of the respondents in the survey worked for European multinational companies, followed by a few Asian and little representation from multinationals in the rest of the world.

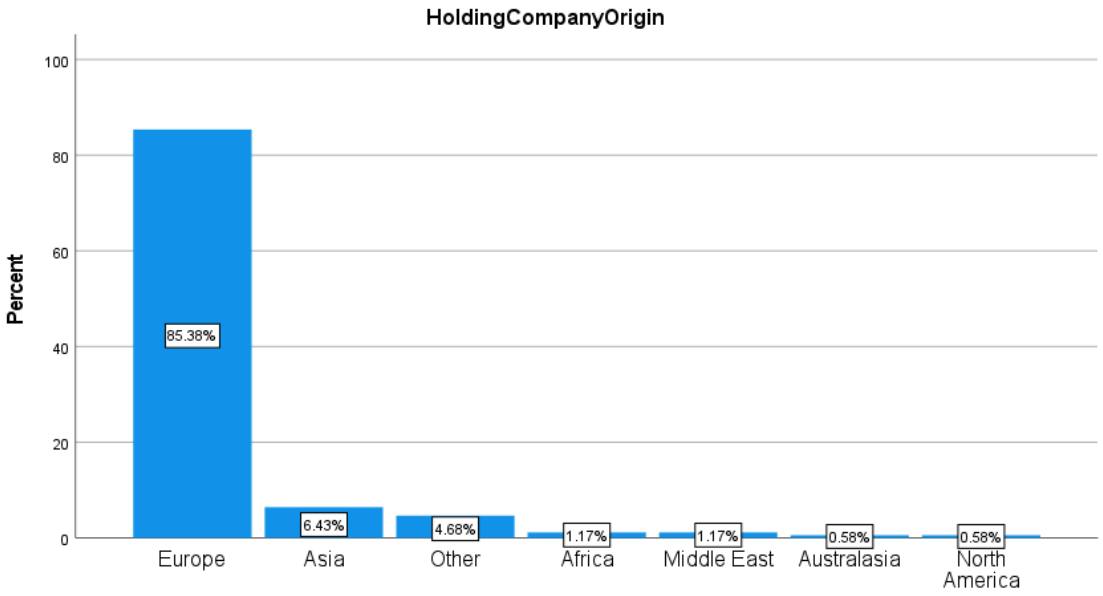

Figure 4: Respondents' Holding Company Origin

4.1.1 Demonstration of strategic mandate by parent company to transfer knowledge

The responses relating to whether participants felt the parent company demonstrated a strategic mandate to transfer knowledge to the local subsidiary were as demonstrated in Figure 5 below.

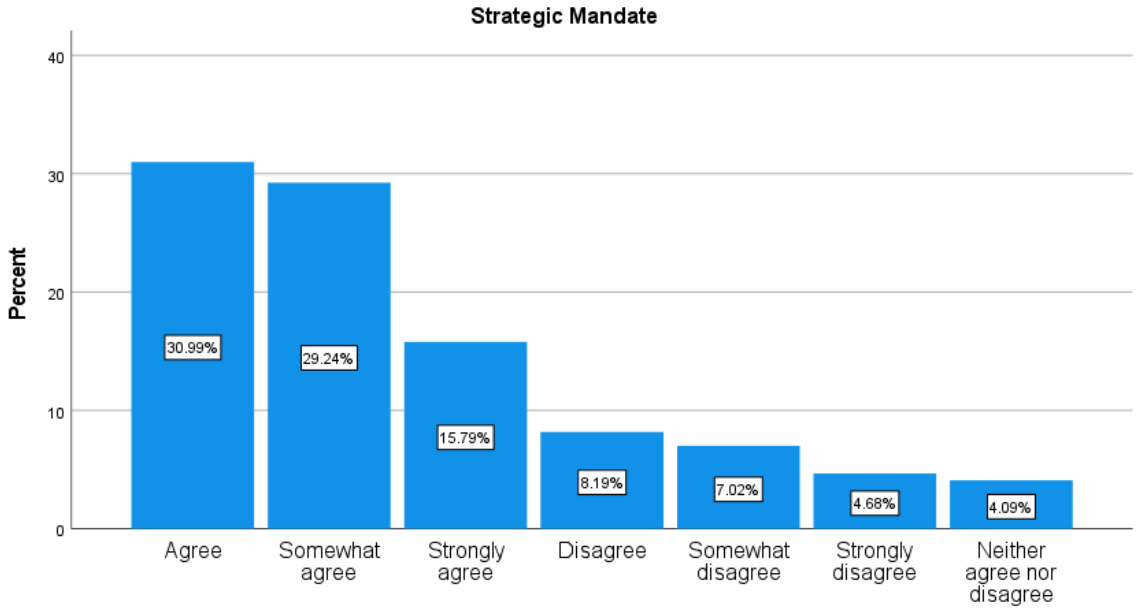

Figure 5: Perception of Strategic Mandate for Parent Company to Transfer Knowledge to Local Subsidiary

A positive perception, agreement to some or other degree, was observed in approximately 83% of the responses.

4.1.2 Value of knowledge stock within holding company

In response to whether the participants felt that the holding company had knowledge that would be of value to the South African subsidiary, the respondents answered as shown in Figure 6 with 10.52% having a neutral or negative perception of the value of the parent companies' knowledge stock.

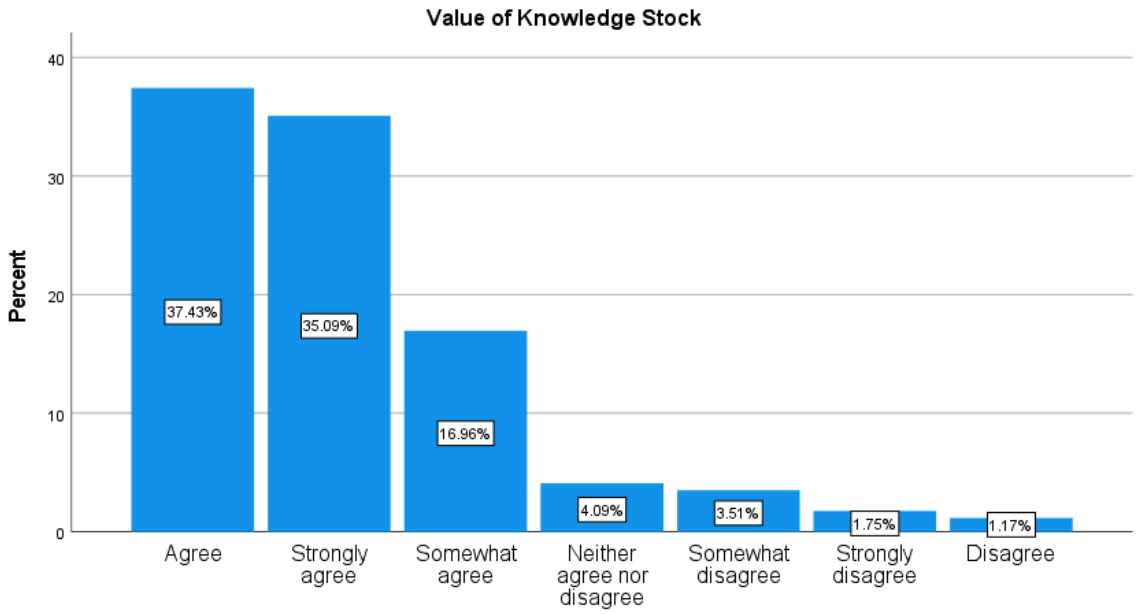

Figure 6:Perceived Value of Knowledge Stock of Parent Company

4.1.3 Perception of high cultural distance between holding and local company

In response to whether the cultural distance between holding company and local subsidiary can be described as high, most respondents agreed to different degrees as shown in Figure 7.

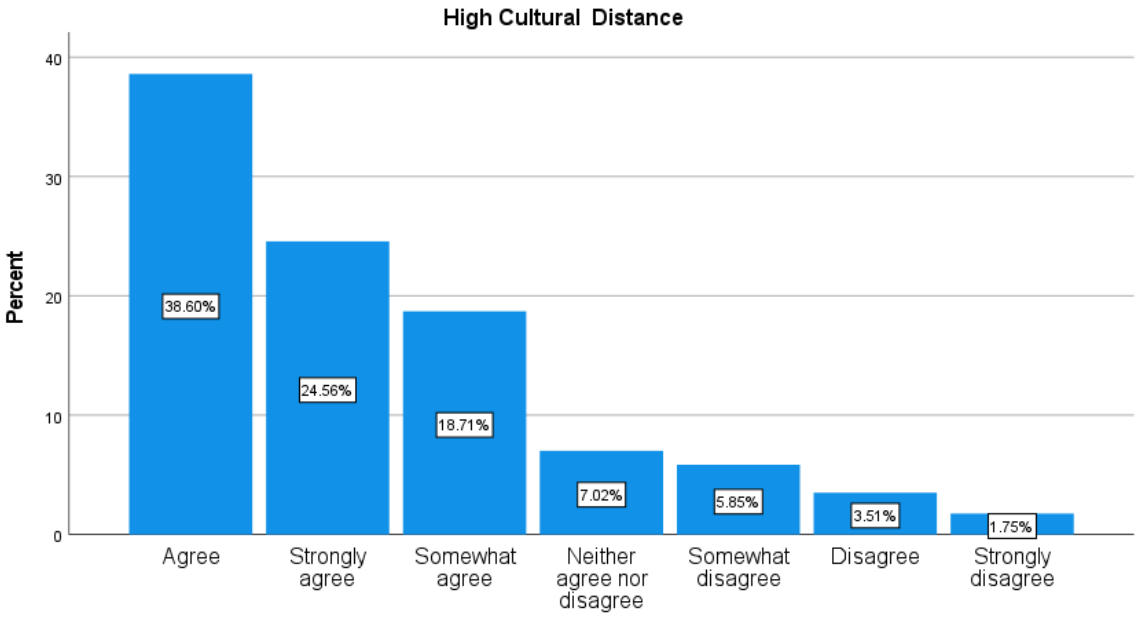

Figure 7: Perception of High Cultural Distance Between Parent Country and South Africa

4.1.4 Perception of high organisational distance between holding and local company

In response to whether the organisational distance and practices between holding company and local subsidiary can be described as high, most respondents also agreed to different degrees. The responses are shown in the Figure 8 below.

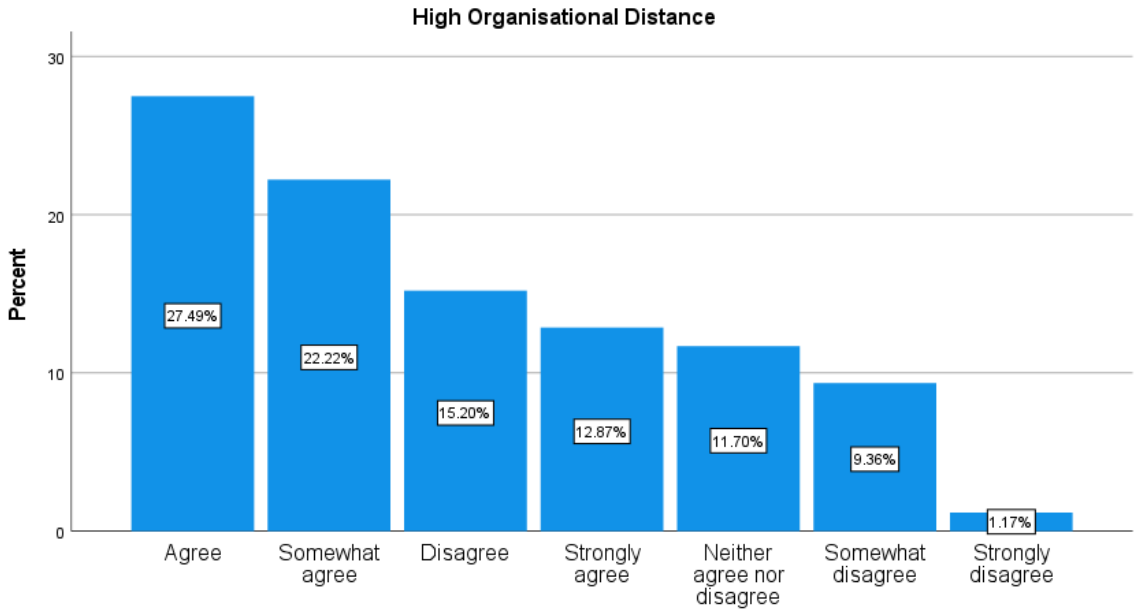

Figure 8: Perception of High Organisational Distance Between Parent and Subsidiary

4.1.5 Perception of company knowledge transfer capabilities

Four questions were posed to gauge the perceived knowledge transfer capabilities of the respondents' companies. The first enquired if the company has dedicated systems databases and repositories for knowledge transfer. This was answered as per Figure 9 below.

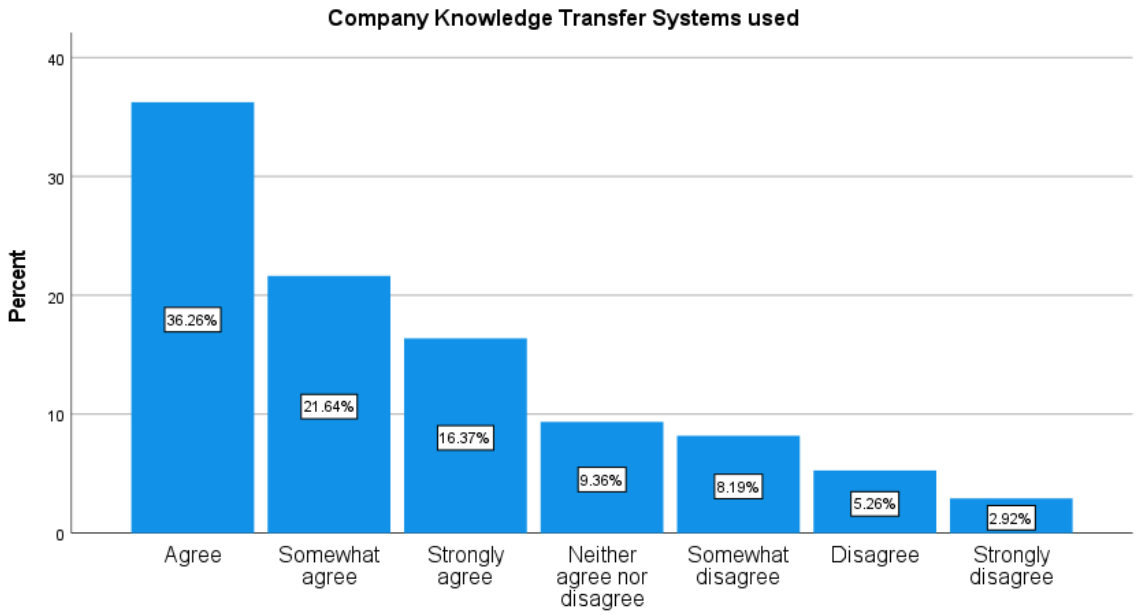

Figure 9: Presence of Dedicated Information Systems, Databases and Repositories for Knowledge Transfer

The second question looked at the different types of knowledge transfer mechanisms employed by the company and allowed respondents to select more than one where applicable. The total responses are summarised in Figure 10 below. The number of transfer mechanisms used within the companies is highlighted in Figure 11.

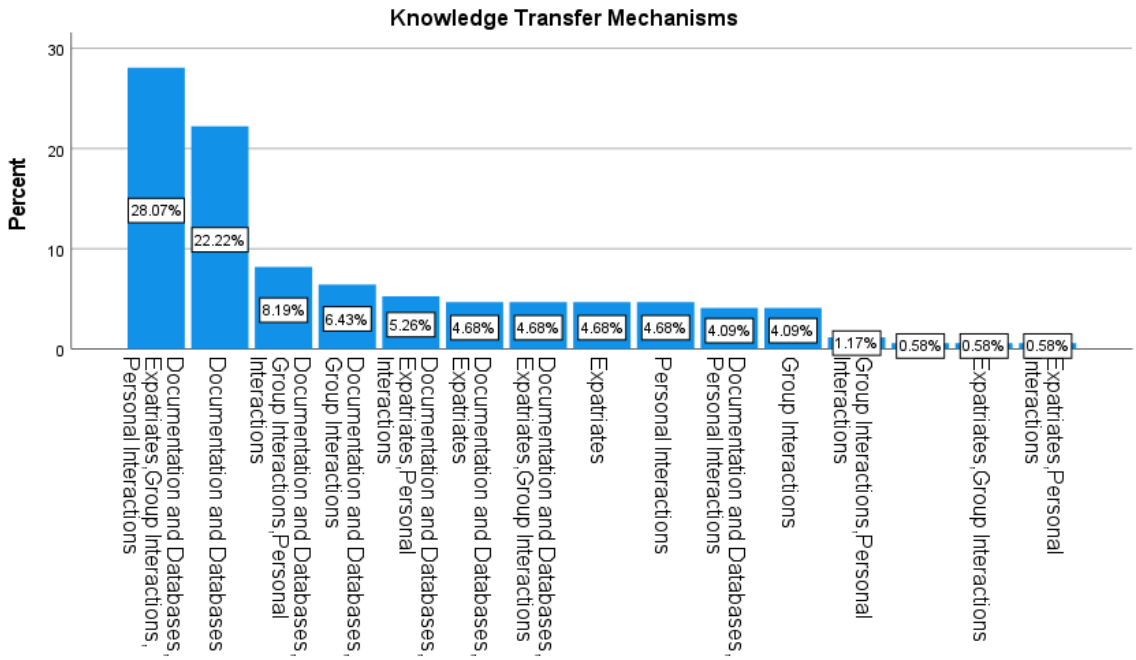

Figure 10: Knowledge Transfer Mechanisms

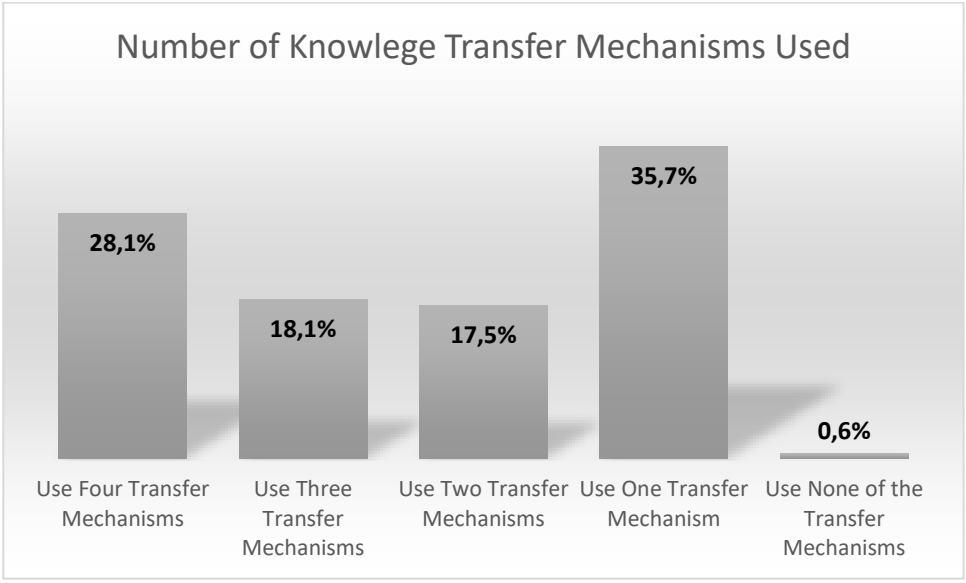

Figure 11: Number of Transfer Mechanisms Used for Knowledge Transfer

The third question enquired whether expatriates in the company were perceived to be culturally aware and able to navigate cultural differences well. The responses to this question are shown in Figure 12.

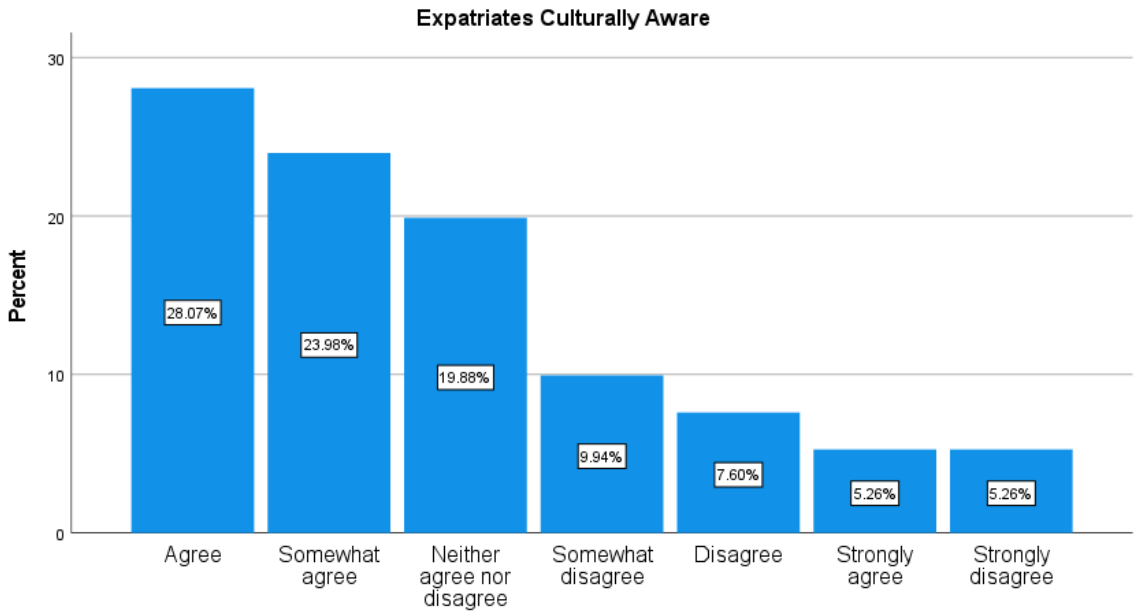

Figure 12: Expatriates perceived as cultural aware and able to navigate cultural differences

The last question enquired whether the company's processes allowed the respondents to gain new knowledge. The responses to this question are shown in Figure 13 and highlight positive responses by the majority.

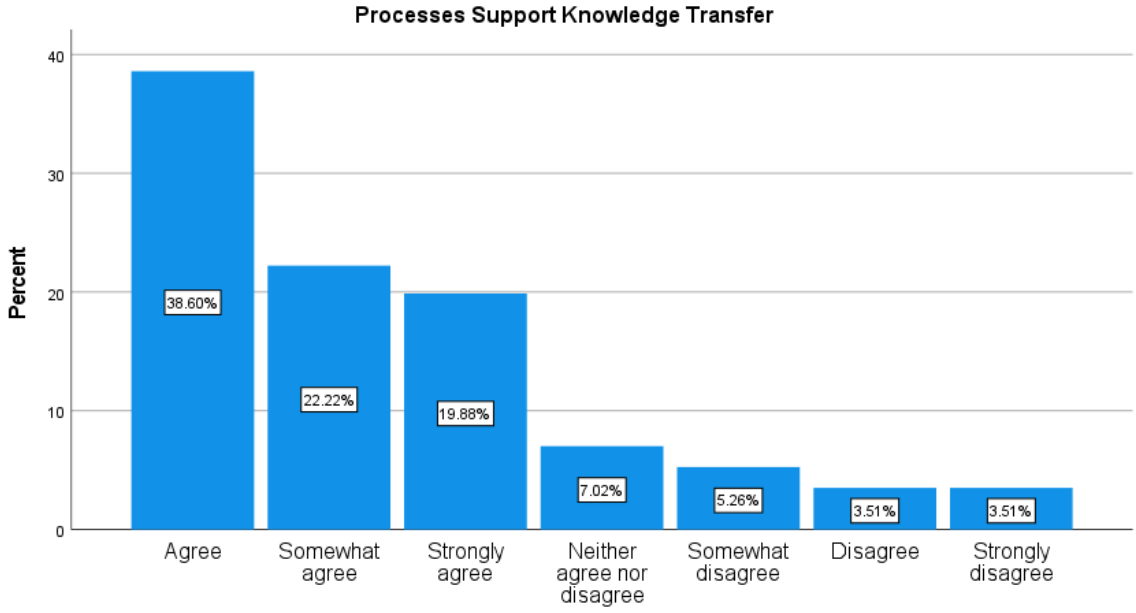

Figure 13: Company processes Support Knowledge Transfer

4.1.6 Perception of knowledge transfer effectiveness

The effectiveness of knowledge transfer was gauged through two questions. The first examined the respondents' satisfaction with their company's know transfer initiatives and is summarised in Figure 14 below.

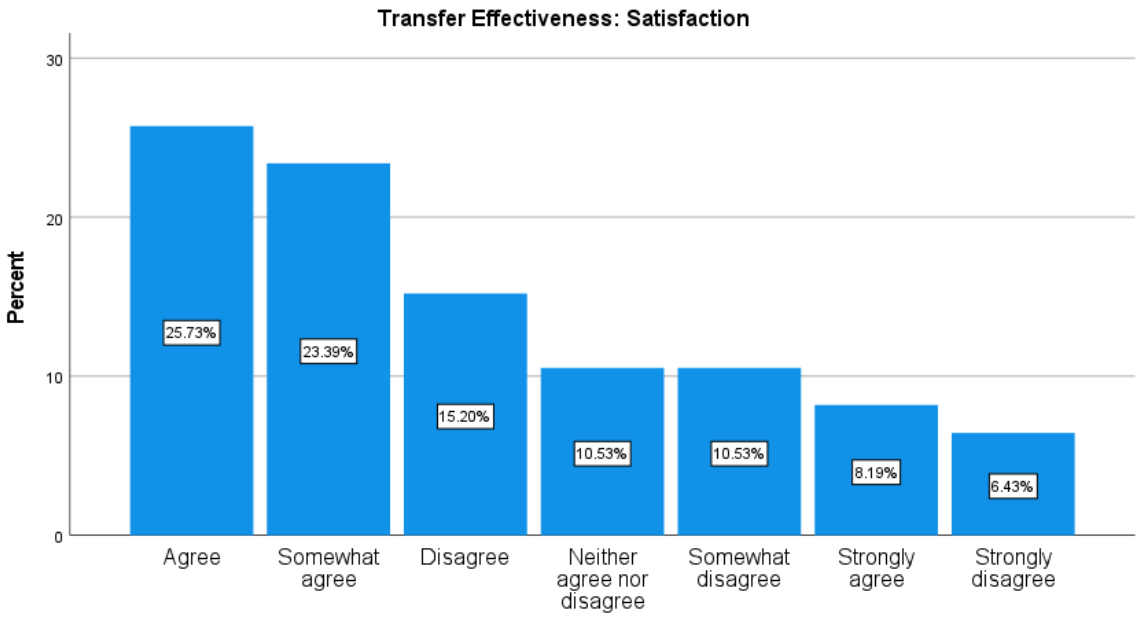

Figure 14: Satisfaction with company knowledge transfer initiatives

The second question measured the degree of perceived benefit of the company's knowledge transfer initiatives as summarised in Figure 15 below.

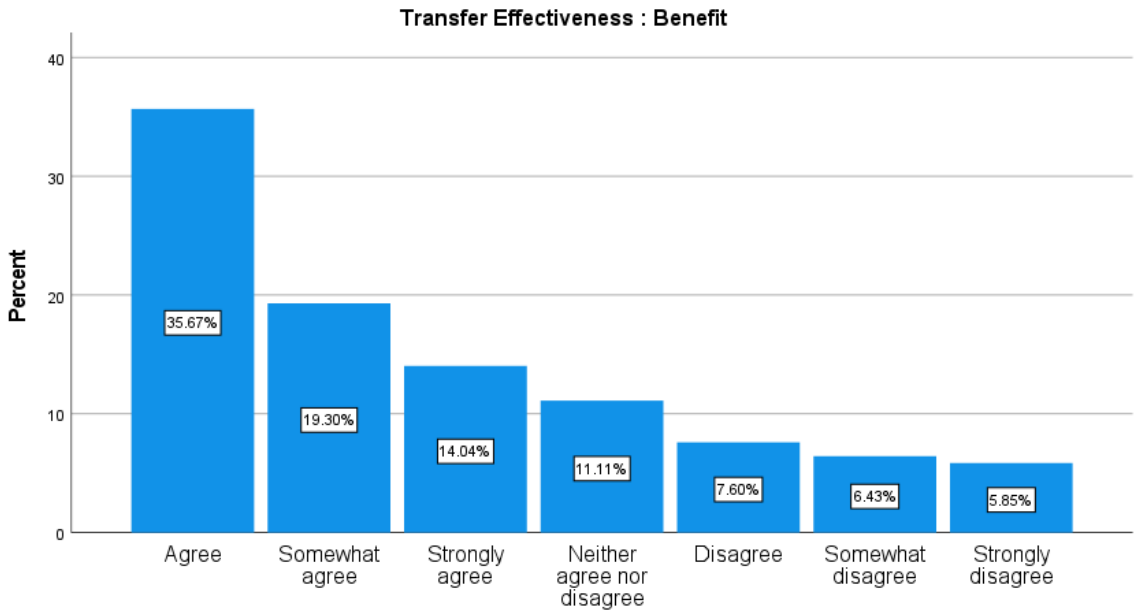

Figure 15: Knowledge Transfer Initiatives Perceived to be of Benefit

4.2 Statistical Analysis of Variables

Analysis of the association between variables as well as multinomial logistics regression was conducted to explore the relationship between variables in the data. The following subsections present the results

4.2.1 Correlation Analysis

Nonparametric correlation analysis of the data using Spearman's rho to measure the strength of the association between the different variables is summarised in Table 2 below. The strongest correlations were between p= 0.601 and 0.653 but no strong correlations were identified, i.e., p>0.7.

Table 2: Spearman's Coefficients of Correlation

		Strategic Mandate	Value Knowledge Stock	High Cultural Distance	Expatriate Cultural Awareness	Dedicated Transfer Systems	Transfer Processes	High Organisational Distance	Transfer Satisfaction	Transfer Benefit	Knowledge Transfer Mechanisms
StrategicMandate	Correlation Coefficient	1.000	.310**	-0.013	.497**	.564**	.493**	-.285**	.601**	.524**	.323**
	Sig. (2-tailed)		0.000	0.862	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ValueKnowledgeStock	Correlation Coefficient	.310**	1.000	0.093	.253**	.263**	.372**	-0.028	.217**	.398**	.182*
	Sig. (2-tailed)	0.000		0.228	0.001	0.000	0.000	0.715	0.004	0.000	0.017
HighCulturalDistance	Correlation Coefficient	-0.013	0.093	1.000	-0.081	-0.048	0.052	.366**	-0.080	0.031	-0.075
	Sig. (2-tailed)	0.862	0.228		0.290	0.532	0.503	0.000	0.298	0.690	0.328
ExpatriateCulturalAwareness	Correlation Coefficient	.497**	.253**	-0.081	1.000	.446**	.450**	-.220**	.487**	.443**	.203**
	Sig. (2-tailed)	0.000	0.001	0.290		0.000	0.000	0.004	0.000	0.000	0.008
DedicatedTransferSystems	Correlation Coefficient	.564**	.263**	-0.048	.446**	1.000	.715**	-.317**	.648**	.498**	.282**
	Sig. (2-tailed)	0.000	0.000	0.532	0.000		0.000	0.000	0.000	0.000	0.000
TransferProcesses	Correlation Coefficient	.493**	.372**	0.052	.450**	.715**	1.000	-.249**	.620**	.570**	.280**
	Sig. (2-tailed)	0.000	0.000	0.503	0.000	0.000		0.001	0.000	0.000	0.000
HighOrganisationalDistance	Correlation Coefficient	-.285**	-0.028	.366**	-.220**	-.317**	-.249**	1.000	-.359**	-.187*	-.195*
	Sig. (2-tailed)	0.000	0.715	0.000	0.004	0.000	0.001		0.000	0.014	0.010
TransferSatisfaction	Correlation Coefficient	.601**	.217**	-0.080	.487**	.648**	.620**	-.359**	1.000	.653**	.221**
	Sig. (2-tailed)	0.000	0.004	0.298	0.000	0.000	0.000	0.000		0.000	0.004
TransferBenefit	Correlation Coefficient	.524**	.398**	0.031	.443**	.498**	.570**	-.187*	.653**	1.000	.211**
	Sig. (2-tailed)	0.000	0.000	0.690	0.000	0.000	0.000	0.014	0.000		0.006
KnowledgeTransferMeans	Correlation Coefficient	.323**	.182*	-0.075	.203**	.282**	.280**	-.195*	.221**	.211**	1.000
	Sig. (2-tailed)	0.000	0.017	0.328	0.008	0.000	0.000	0.010	0.004	0.006	

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

4.2.2 Regression Analysis

Chini (2004) identified two component of knowledge transfer effectiveness, namely, satisfaction and benefit. Two regression analyses were conducted using multinomial logistic regression to test the dependence of these two on the independent variables identified in the model.

The first examined the dependence of the variable “Knowledge Transfer Satisfaction” as a function of all other variables independent variables. The results of this analysis are detailed in tables 3 to 5 below.

Table 3: Model Fit Information for "Transfer Effectiveness Satisfaction" Regression Model

Model Fitting Information

Model	Model Fitting Criteria -2 Log Likelihood	Likelihood Ratio Tests Chi-Square	df	Sig.
Intercept Only	623.958			
Final	146.659	477.298	342	<,001

The final model indicates a significance less than 0.05 hence the regression model developed outperforms the theoretical intercept only model.

Table 4: Pseudo R-Square for "Transfer Effectiveness Satisfaction" Regression Model

Pseudo R-Square

Cox and Snell	.939
Nagelkerke	.963
McFadden	.762

The Pseudo R-Square values for the model indicate the final R-Squared values reached for were satisfactorily high. The Likelihood ratio tests identify “Holding Company Mandate” and “Expatriate Cultural Awareness” as the two effects that

have significance less than 0.05 and hence contribute to the regression model for Transfer Effectiveness Satisfaction.

Table 5: Likelihood Ratio Tests for "Transfer Effectiveness Satisfaction" Regression Model

Likelihood Ratio Tests

Effect	Model Fitting Criteria: -2 Log Likelihood of Reduced Model	Likelihood Ratio Tests: Chi-Square	df	Sig.
Intercept	146.659[a]	.000	0	.
HoldingCompanyMandate	211.029[b]	64.370	42	.015
ValueofKnowledgeStock	182.430[b]	35.771	36	.479
HighCulturalDistance	187.861[b]	41.201	36	.254
KnowledgeTransferMeans	226.515[b]	79.855	84	.608
ExpatriateCulturalAwareness	267.445[b]	120.786	36	<,001
CompanyKnowledgeTransferSystemsused	125.280[b]	.	36	.
KnowledgeTransferCapabilitiesProcesses	151.550[b]	4.891	36	1.000
HighOrganisationalDistance	165.861[b]	19.201	36	.990

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

b. Unexpected singularities in the Hessian matrix are encountered. This indicates that either some predictor variables should be excluded or some categories should be merged.

The second, likewise, examined the dependence of the variable “Knowledge Transfer Benefit” as a function of all other variables independent variables. The results of this model were as per tables 6-8 below.

Table 6: Model Fit Information for "Transfer Effectiveness Benefit" Regression Model

Model Fitting Information

Model	Model Fitting Criteria -2 Log Likelihood	Likelihood Ratio Tests Chi-Square	df	Sig.
Intercept Only	594.026			
Final	110.508	483.518	342	<,001

The final model indicates a significance less than 0.05 hence the regression model developed outperforms the theoretical intercept only model.

Table 7: Pseudo R-Square for "Transfer Effectiveness Benefit" Regression Model

Pseudo R-Square

Cox and Snell	.941
Nagelkerke	.971
McFadden	.811

The Pseudo R-Square values for the model indicate the final R-Squared values reached for were satisfactorily high. The likelihood ratio tests identify that all the effects except for “Company Knowledge Transfer Systems Used” have significance less than 0.05 and hence contribute to the model.

Table 8: Likelihood Ratio Tests for "Transfer Effectiveness Benefit" Regression Model

Likelihood Ratio Tests

Effect	Model Fitting Criteria: -2 Log Likelihood of Reduced Model	Likelihood Ratio Tests: Chi-Square	df	Sig.
Intercept	110.508[a]	.000	0	.
HoldingCompanyMandate	263.798[b]	153.289	42	<,001
ValueofKnowledgeStock	247.802[b]	137.294	36	<,001
HighCulturalDistance	166.493[b]	55.985	36	.018
KnowledgeTransferMeans	32573.724[b]	32463.216	84	.000
ExpatriateCulturalAwareness	231.642[b]	121.133	36	<,001
CompanyKnowledgeTransferSystemsused	146.148[b]	35.640	36	.486
KnowledgeTransferCapabilitiesProcesses	165.319[b]	54.811	36	.023
HighOrganisationalDistance	206.613[b]	96.104	36	<,001

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

b. Unexpected singularities in the Hessian matrix are encountered. This indicates that either some predictor variables should be excluded or some categories should be merged.

4.2.3 Reliability Analysis

Analysis of the internal reliability of the survey was conducted using Cronbach's Alpha. The results highlight an alpha of 0.765 as shown in the table below.

Table 9: Reliability Analysis

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.765	.762	10

4.3 Evaluation of Hypothesis

The following subsections review each of the hypothesis investigated in this study in view of the results of the survey and statistical analysis. A summary table of the hypothesis, the acceptance/rejection and evidence thereof were included in Table 10.

Table 10: Summary of Hypothesis Tests

Hypothesis #	Null Hypothesis	Null Hypothesis Accepted	Evidence
1	H0 – MNC employees feel that their parent companies have a strategic mandate to transfer knowledge to the local subsidiary	Yes	83% of respondents answered affirmatively, Figure 5
2	H0 – The perceived level of strategic mandate to transfer knowledge to the local subsidiary has a positive effect on the perceived effectiveness of knowledge transfer.	Yes	Significant and modest positive correlation with Transfer Satisfaction and Transfer Benefit. Table 2
3	H0 – MNC employees feel that their parent companies have knowledge that is valuable to the local subsidiary	Yes	89.48% of respondents answered affirmatively, Figure 6
4	H0 – The perceived level of parent company knowledge value has a positive effect on the perceived effectiveness of knowledge transfer.	Inconclusive	Significant but weak positive correlations with Transfer Satisfaction and Transfer Benefit. Table 2
5	H0 – MNCs in the South African renewable energy industry use different transfer mechanisms to transfer knowledge	Yes	Respondents indicated different types of transfer mechanisms used. Figures 10 and 11
6	H0 – Expatriates in MNCs in the South African renewable energy industry are culturally adept and affect perceived knowledge transfer effectiveness positively	Yes	57.31% of respondents affirmed cultural awareness of expatriates, Figure 12. Significant and modest positive correlation with Transfer Satisfaction and Transfer Benefit. Table 2
7	H0 –MNCs in the South African renewable energy industry have processes and information systems that are perceived to positively contribute to knowledge transfer	Yes	74.27% affirmed presence of dedicated knowledge transfer systems, Figure 9. 80.5% affirmed processes support knowledge transfer. Significant and modest positive correlation for both dedicated systems and processes with Transfer Satisfaction and Transfer Benefit. Table 2
8	H0 – Employee perceptions of high cultural distance between parent company country and South Africa negatively affects perceptions of transfer effectiveness	Rejected	Insignificant and low correlations with Transfer Satisfaction and Transfer Benefit. Table 2
9	H0 – Employee perceptions of high organisational distance between parent company country and South African subsidiary negatively affects perceptions of transfer effectiveness	Inconclusive	Significant but weak negative correlations with Transfer Satisfaction and Transfer Benefit. Table 2
10	H0 – The perceived effectiveness of knowledge transfer within the South African renewable energy industry can be represented by a regression model with independent variables Strategic Mandate, Knowledge Stock Value, Cultural Distance, Organisational Distance and MNC Knowledge Transfer Capabilities	Yes	Successful regression models developed for both Transfer Satisfaction and Transfer Benefit. Tables 3-8

5 DISCUSSION

This section discusses the findings in relation to the scholarly literature. The overall characteristics of the study are first discussed followed by a discussion of the findings of the study.

5.1 Study Confidence Level and Error or Margin

This study set out with a targeted a minimum sample size of 255 respondents to obtain a 90% confidence level and 5% error margin based on the estimated population size of 4399. Due to challenges in obtaining responses, a total workable sample of 171 respondents was achieved after filtering out 44 incomplete and non-qualifying responses from respondents not in the target population. This sample size calculates to a 7% margin of error at a 95% confidence level. Although this is not the desired sample size, the achieved margin of error and confidence level is acceptable for this research (Ahmad & Halim, 2017).

5.2 Study Reliability and Validity

The reliability of the study was calculated at a Cronbach's Alpha of $\alpha=0.765$. Whilst a level of $\alpha>0.8$ is deemed as very good (Idris & Chan, 2017), a level of $0.7< \alpha<0.8$ is deemed as an acceptable level of internal reliability (Tavakol & Dennick, 2011).Hence the study was designed and executed in a manner that was consistent with the aims of the research. As indicated by the research, internal validity is judged (Andrade, 2018) and external validity was highlighted in the methodology section as not applying to this research.

5.3 Study Representation of the REIPPP Industry

The survey included an indication of the geographic origin of the parent company. This was included to firstly be able to conduct an analysis of variance across the different categories of parent company origin and secondly to be able to analyse how well the sample represented the expected distribution of multinational companies in the REIPPP reported as equity partners by the literature. The

literature indicates an equity contribution in the REIPPP as highlighted in the table below (Independent Power Producers Procurement Programme, 2021).

Table 11: Equity contribution sources into the REIPPP (Independent Power Producers Procurement Programme, 2021)

Europe	63.2%
North America	1.9%
Africa	0.9%
Asia	33.5%
Australasia	0.5%

In comparison to the equity contribution to the REIPPP, the distribution of study respondents was as per Table 12 below.

Table 12: REIPPP Equity Contribution vs Distribution of MNCs in Survey Response

	REIPP Equity Contribution	MNC Parent Origins for Survey Respondents
Europe	63.2%	85.38%
North America	1.9%	0.580%
Africa	0.9%	1.170%
Asia	33.5%	6.430%
Australasia	0.5%	0.580%
Other		4.60%

The REIPPP Equity Contribution can be viewed as a proxy indication of the distribution of multinational companies within the REIPPP. The difference in distribution between respondents and the equity contribution indicates that the study does not fully represent the industry. There was overrepresentation of European and African multinational companies, whilst North American and Asian multinational companies were underrepresented. Australasian companies were relatively well represented from a percentage point of view but numerically only translate to 1 respondent and can hence not adequate to make judgements. It is noted that not all multinational companies participating within the industry around the REIPPP would be equity holders. However, given that an overwhelming majority of respondents represented European multinational companies, the study results would be more applicable to European multinationals and not the industry.

5.4 Discussion of Findings

5.4.1 Demonstration of strategic mandate by parent company to transfer knowledge

Respondents positively affirmed the perceptions of parent companies having a strategic mandate to transfer knowledge, one of the critical factors identified by Pawlowski & Bick (2012), and this was shown to have a modest corelation with transfer effectiveness as well as shown to be a significant factor for both the regression models for satisfaction and benefit. This finding is in line with the model developed by Chini (2004) in which strategic mandate is one of the key factors that lead to knowledge transfer effectiveness. Heisig (2009) also highlighted management strategy as a critical success factor in the transfer of knowledge. Rahman & Mould (2017) noted strategic mandate as a key determinant of knowledge transfer and the results of this study indicate that strategic mandate is present in REIPPP industry and a key driver of knowledge transfer.

5.4.2 Value of knowledge stock within holding company

Value of the knowledge stock of parent companies within the industry was positively acknowledged by approximately 89% of respondents. Notably this was calculated as a significant factor in the perceived benefit of knowledge transfer, as shown by Chini (2004), but was insignificant in the regression model for satisfaction in keeping with the finding by Minbaeva (2007) that transfer success is a function of the knowledge characteristics.

5.4.3 Perception of high cultural distance between holding and local company

High Cultural Distance was affirmed as being present in the study however it was shown to have low correlations with both satisfaction and benefit of -0.08 and 0.031 respectively. This finding shows that in the context of this study high cultural distance has very little effect on the perceived effectiveness of knowledge transfer. Literature highlights cultural distance as a critical negative factor (Dobra, Farkas, Karoliny, & Poór, 2012 ; Vlajcic, Caputo, Marzi, & Dabic, 2019) whilst also

noting this should be overcome by adjustments in communication media (Pedersen, Petersen, & Sharma, 2003). Contrary to the indication that high cultural distance would adversely affect knowledge transfer (Dobra, Farkas, Karoliny, & Poór, 2012 ; Vlajcic, Caputo, Marzi, & Dabic, 2019), the study found this not to be the case in the REIPPP industry.

5.4.4 Perception of high organisational distance between holding and local company

High Organisational Distance was affirmed by majority of respondents and was shown to have a moderate to low negative effect on transfer effectiveness. Whilst organisational distance is a critical success factor (Dobra, Farkas, Karoliny, & Poór, 2012 ; Pedersen, Petersen, & Sharma, 2003 ; Rahman & Mohd Shamsul Mohd, 2017 ; Vlajcic, Caputo, Marzi, & Dabic, 2019 ; Argote & Ingram, 2000 ; Chini, 2004), the study found this to have a low to moderate negative association with knowledge transfer effectiveness.

5.4.5 Perception of company knowledge transfer capabilities

With respect to knowledge transfer capabilities of multinationals in the industry respondents indicated the presence of dedicated systems for knowledge transfer, processes that support knowledge transfer, use or different transfer mechanisms and the presence of culturally aware expatriates that navigate cultural differences well.

There were several combinations of transfer mechanisms used in the respondent's companies, this is in line with the highlighted the importance of selecting a particular transfer mechanism to support the distance between countries (Dobra, Farkas, Karoliny, & Poór, 2012). Notably Expatriate Cultural Awareness, Dedicated Knowledge Transfer Systems and Processes have the positive correlations with satisfaction and benefit all ranging between 0.443 and 0.643. These three, together with strategic mandate which in the Chini (2004) model feeds into transfer capabilities, represent the strongest correlations with transfer benefit and satisfaction.

Of particular interest was the regression model for transfer satisfaction which highlighted that only strategic mandate and the presence of culturally aware expatriates were significant factors for knowledge transfer satisfaction. These observations support the findings of Vlajcic et al.(2019) that cultural quotient of expatriates is an important factor for effectiveness.

5.4.6 Perception of knowledge transfer effectiveness

Respondents in the study positively affirmed the satisfaction with and benefit of knowledge transfer. The perceived satisfaction with knowledge transfer was positively affirmed by 65.98% of respondents and the perceived benefit of knowledge transfer was positively affirmed by 69.01%. The remaining expressed perceptions of neutrality or disagreement with others strongly disagreeing, 6.43% for satisfaction and 5.85% for benefit. With respect to satisfaction, those disagreeing were the third category. These results can be interpreted to highlight an overall positive perception of knowledge transfer effectiveness within multinationals in South Africa under the REIPPP but there is room for improvement based on the indication of 30%+ who could not positively affirm. There were also pockets of the sample that strongly disagreed to the satisfaction with and benefit of knowledge transfer thereby further emphasising the room for improvement in some companies.

6 CONCLUSION AND RECOMMENDATIONS

This section draws conclusions to the two research questions posed, provides an indication of the implications and limitations of the study, and then concludes with recommendations to stakeholders and recommendations for future studies.

6.1 Experiences and perceptions of the local subsidiary employees regarding knowledge transfer

The study found that most respondents were satisfied with and identified the benefits of their company’s knowledge transfer initiatives, 65.98% and 69.01% respectively. Respondents predominantly had positive views of all aspects of the

strategies, processes and systems used in the transfer of knowledge. This was despite the identification of high cultural distance and high organisational distance. It is noted that there were respondents who disagreed and sometimes strongly disagreed to the effectiveness as well as to the presence of transfer strategy, processes and systems. This suggests that there is room for improvement in some companies.

The study found that there was a high cultural distance between the home countries multinational companies within the REIPPP and South Africa. There was however a low correlation between high cultural distance and the perceived effectiveness of knowledge transfer. The low correlation between suggests that companies in the industry have found effective ways to manage cultural distance. These include the use of systems, processes, technology as well as expatriates to bridge the cultural distance gap.

High organisational distance between parent company and the local subsidiaries was affirmed by the study. However, the study could not determine the effect this has on knowledge transfer as the evaluation of this hypothesis proved inconclusive. Likewise, the study could not identify the value of the company parent knowledge stock as being a determinant in the satisfaction of transfer effectiveness. This was however found to be significant for benefit of transfer.

6.2 Applicability of critical success factors and seminal models

The study found that multinational companies within the REIPPP apply the knowledge transfer practices that were aligned with the critical success factor identified in knowledge transfer literature. Most of the respondendts' companies seem to have in place the structures, processes and technological infrastructure that Rahmad & Mohd Shamul Mohd (2017) identified as critical success factors. These include strategic management mandate, the use of dedicated knowledge transfer technological platforms and processes as well as the use of expatriates that were generally culturally aware and able to navigate cultural differences. There were however small pockets of individuals who felt negatively about the knowledge transfer initiatives of their companies thereby indicating that there was room for improvement within some companies.

Lastly, the Chini (2004) model was found to be largely applicable to knowledge transfer in the multinational companies within the REIPPP. Within the study group, perceptions of transfer satisfaction were linked to parent company strategic mandate and cultural awareness of the expatriates. Perceptions of the benefit derived from knowledge transfer were linked to all aspects of the model except for the use of dedicated knowledge transfer systems. The implication was that the benefit of knowledge transfer is perceived even when there is no dedicated knowledge transfer system employed by the company.

6.3 Theoretical Implications

The significance of the research findings is that they contribute to an area that has not been well studied in the renewable energy industry in South Africa. The study provides an indication of application of knowledge transfer strategy, systems, mechanisms and processes in the sector. The study also highlights the idea of a high association strategic mandate and culturally aware expatriates with knoweldge transfer satisfaction.

6.4 Practical Implications

This study affirms to multinational companies in the study areas that the strategies, methods, structures, processes and technological systems employed in the transfer of knowledge were predominantly perceived as adding value to South African employees. Furthermore it provides an indication of the key associated elements for knowledge transfer effectiveness benefit and satisfaction.

6.5 Limitations of the study

No sources were identified that provide an accurate indication of the target population, consequently the population was estimated but the desired sample size to achieve a 5% error margin for this estimated population was not reached, only 7% was attained.

Due to the relative overrepresentation of European multinational company respondents, the study is more representative of knowledge transfer in European multinationals.

The study was performed using a Likert-scale for the core questions. Likert scale surveys are affected by the central tendency bias (Douven, 2017).

6.6 Recommendations

Based on the study the following recommendations could apply to stakeholders of the Renewable Energy Independent Power Producer Programme and other government programs that have substantial involvement of multinational companies with local subsidiaries.

Firstly, multinational companies within the sector must periodically asses the effectiveness of their knowledge transfer initiatives to allow for adjustment of strategy and ensure optimal results. This is in view of the the modest 65-69% reported for transfer effectiveness.

Given the benefits of knowledge transfer identified in the literature and the research findings that some employees have yet to realise these benefits, multinational companies should continue to intentionally invest in knowledge transfer initiatives to their local subsidiaries with the view of maximising the benefits to the local subsidiary and the parent organisation through increased productivity and possible reverse knowledge transfer opportunities.

There is a relatively high correlation between Strategic Mandate, Dedicated Knowledge Transfer Systems, and Dedicated Knowledge Transfer processes with Transfer Benefit and Transfer Satisifaction. Given this, multinational companies should ensure the presence of these factors and focus on these factors in order to maximise the benefits of their transfer initiatives to local subsidiary employees.

Lastly, government programmes such as the REIPPP must find ways to encourage and measure effective knowledge transfer. It is logical to suppose that knowledge transfer will happen without encouragement but the moderate level of

satisfaction and benefit identified by the study as well as the strong disagreement by some respondents suggests that not all multinational companies are embracing the spirit of knowledge transfer optimally. If the government programmes are to achieve the desired goal of knowledge transfer then measures and targets must be looked at.

6.7 Future Studies

Possible further studies the expansion of the sample to a larger and more representative one, the implications of knowledge transfer within the renewable energy industry on the development and transfer of skills, as well as the development of the local commercialisation of transferred knowledge.

Research can also be undertaken within the renewable energy industry in South Africa relating to the improvements in productivity following the application of knowledge transfer initiatives by the parent company to the local subsidiaries. This could possibly also be expanded to investigate the quantification of the monetary benefits of the possible increases in productivity by the local subsidiary.

Furthermore, future studies could investigate the benefits of knowledge transfer to previously disadvantaged groups within the South African renewable energy industry in alignment with national initiatives towards the empowerment of these groups.

Additionally , research could also be aimed at investigating the benefits of reverse-knowledge transfer from South African subsidiaries to their parent companies as a by-product of the parent companies knowledge transfer initiatives.

Lastly, studies could be directed at investigating the difference in obtained benefits in organisations with focused and dedicated knowledge transfer initiatives versus those organisations that do not have structured knowlegde transfer programmes. This could provide a means of investigating whether or not knowledge transfer requires intentional dedicated programmes in order to be effective.

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APPENDIX A: SURVEY INSTRUMENT

Information of survey purpose (masters research, results to be published in journal article), anonymity, informed consent (no personal data besides age requested).

General Questions/Demographics and qualification criteria

1. Does your company have a holding/parent company outside of South Africa that actively manages the South African company [Y/N]?
2. Origin of the parent company/Location of Head Quarters [Asia, Middle East, Africa, North America, South America, Europe, Australasia, other]

Questions based on Chini (2004) MNC Knowledge Transfer Model

3. Strategic mandate: The parent company has or demonstrates a strategic mandate to transfer knowledge to the local subsidiary [1-7 Likert scale, Strongly Disagree – Strongly Agree]
4. Value of knowledge stock: The parent company has knowledge that would be valuable to the South African subsidiary [1-7 Likert scale, Strongly Disagree – Strongly Agree]
5. Cultural Distance: The level of difference in culture between the parent company and South Africa is [1-7 Likert scale, Very Low, Very High]
6. Knowledge transfer capabilities: Our company uses the following means to transfer knowledge (select all applicable) [Expatriates, Documentation and Databases, Group Interactions, Personal Interactions]
7. Knowledge transfer capabilities: The expatriates in our company are culturally aware and navigate the culturally differences well [1-7 Likert scale, Strongly Disagree – Strongly Agree, option for N/A]

8. Knowledge transfer capabilities: Our company has information systems, databases, and repositories etc dedicated to knowledge transfer and accessible to me [1-7 Likert scale, Strongly Disagree – Strongly Agree]

9. Knowledge transfer capabilities: Our company processes have allowed me to gain new knowledge and know how [1-7 Likert scale, Strongly Disagree – Strongly Agree]
10. Organizational distance: The difference in organisational practices between head office and the South Africa offices is [1-7 Likert scale, Very Low, Low, Very High]
11. Transfer effectiveness: I am satisfied with the knowledge transfer initiatives in our company [1-7 Likert scale, Strongly Disagree – Strongly Agree]
12. Transfer effectiveness: I believe the knowledge transfer initiatives within my company to be of great benefit to me [1-7 Likert scale, Strongly Disagree – Strongly Agree]