

# The impact of location decision: A review

Alice Kabamba Lumbwe, Eveth Nwobodo-Anyadiegwu, Charles Mbohwa

Department of Quality and Operations Management

University of Johannesburg

Johannesburg, South Africa

alichel@uj.ac.za, evethn@uj.ac.za, cmbohwa@uj.ac.za

## Abstract

One of the ten primary decision areas in operations management is location decision that aims to fulfill at least one objective such as minimization of cost, distances, service time, or waiting time; and optimization of profit and other business performance outcomes. Although studies on the impact location decision on organisational success have been conducted over the past decades, there is a dearth of review studies on this area of operations management. Therefore, this research presents an extensive review of the effect of location decision based on literature-informed data. Also incorporated herein is a brief historical viewpoint of location decision. These synopsis provide “new” researchers of location decision with a comprehensive reference guide on the original works in the field. The findings revealed research gaps: scarcity of mixed method studies, and the use of sophisticated analytical techniques due sample size limitations.

## Keywords

Location Decision, Operations Management

## 1. Introduction

One of the ten primary decision areas of operations management, location decision, plays a significant role in operations management (Heizer, 2016; Lumbwe et al 2018). It is a strategic decision that can be used in many areas including public and private sectors, military environment, national and international scopes (Lumbwe, Nwobodo-Anyadiegwu, and Mbohwa, 2018; Farahani, and Hekmatfar, 2009). Theories of location decision intend to elaborate the reason a business selects a specific location and not another (Dubé et al, 2016). The perfect location decision is without doubt selecting the best possible place among a given set of alternatives and constraints with the objectives of either maximizing profit or minimizing cost (Dubé et al, 2016).

Location decision is critical since it can impact on a company's growth, success, and failure. (Lumbwe et al 2018; Mbugua, 2011). In order to achieve an ideal location decision, it is important to identify, analyse, and evaluate the critical location factors that are most important to the success of business (Heizer, 2016; Lumbwe et al 2018; Yang, and Lee, 1997; Mbugua, 2011).

The purpose of this study is to present a research gap analysis based on an evaluation of relevant research papers. This research will contribute to the theory and practice of operations management research, specifically in the field of location decision.

## 2. Literature review

Location decision also referred as facility location has a long and extensive history (Thumawongchai and Huang, 2011). As this area of study has evolved, challenges and various external factors such as the world economy, technology and environment issues impacted the existing models used in location decision; driven by the continuous changing trends and criteria on location decisions (Thumawongchai and Huang, 2011). As a result, theories have been continuously developed to assist businesses to make a better decision (Kalantari, 2013).

Table 1. Location decision theory

Authors (year)	History
<b>Thunen, (1929)</b>	First researcher to develop a standardised method for evaluating location decisions from an economic perspective. His research was based on the "least-cost" approach to location.
<b>Launhardt, (1885)</b>	Analysed location decision process by examining the difference between the cost and demand factors at alternative locations. In addition, through his research, he was able to identify the importance of transportation costs when making a location decision.
<b>Weber, (1909)</b>	His study is regarded as an important milestone in the study of the Industrial Location Decision. He suggested three significant facility location decisions factors: transportation cost, labour cost and agglomeration forces.
<b>Hotelling, (1929)</b>	Another innovative research in the history of Industrial Location Decision. He examined competition that existed among businesses and tried to build a relationship between this competition and location decisions. He also demonstrated that businesses tend to select their facility location proximity the center of the market. Hotelling's research became the foundation of many future studies. Some studies tried to upgrade his model by adding more aspects to it. Some others argued his theory and recommended new models for the location decision behavior of companies (Ohlin, 1935; Lerner and Singar, 1937; Smithies, 1941; Chamberlain, 1946; Ohlin, 1952; Kats, 1995; Balvers and Szerb, 1996)
<b>Lösch, (1940)</b>	Another important theory in the literature. The theory was based on location of a facility in a free economy and recommended the use of cost and demand curves analysis to obtain best location decision.
<b>Hoover, (1937)</b>	A theory research that was based on cost and demand (Hoover, 1937; Hoover, 1948). The theory proved that freight rates make the transportation cost to act in a nonlinear way.
<b>Greenhut, (1959)</b>	Develop a theory that combines location theory with practice.

## 2.1. Review of relevant research publications

This section dissects and examines the work done in previous studies. It was observed that there are indeed past studies that have researched on the impact of location decision. The following section shows all critical assessed studies and they are analyzed

Lumbwe, Nwobodo-Anyadiegwu, and Mbohwa (2021) conducted a location decision research in South Africa. Their research includes the data on the Exploratory Analysis of Factors involved in location decision factors of manufacturing and service SMMEs in Johannesburg, South Africa. Survey data was collected from 211 SMME owner/managers. The findings of the research revealed 12 main factors of location decision including cost, workforce in place, employment creation, labour qualification, safe environment, basic needs, social climate, proximity to supplier, proximity to competitors, proximity to customers, rental rate, and green building. This result opens a gap to assess the impact the mentioned location decision factors could have on the survival of an organization.

According to Sholihuddin, Rivai, and Saragih's (2020) research in Indonesia, location and price influence consumer satisfaction through purchasing decisions, implying that a strategic location can boost customer satisfaction when purchasing decisions are made rationally. Because of the gap observed, future research should expand their research model to include other factors that affect customer satisfaction besides location and price, such as service quality, corporate image, and customer value.

Chatzoglou, Chatzoglou, Chatzoudes, Petrakopoulou, and Polychrou (2018) examined factors affecting investors' facility location decisions. The major aim of their study was to integrate the most significant measures used in the international literature and conceptualise a new research decision model. Their suggested research model was verified on a portion of manufacturing companies in Greece. The data collected were evaluated by means of the "structural equation modelling" method. Their study was based on an explanatory (tests cause and effect relationships), deductive (examines research hypotheses), empirical (gathers primary data), qualitative (in order to improve its suggested research model, and quantitative (evaluates quantitative data that were collected using structured questionnaire). The results of this research revealed that cost issues, market characteristics, and infrastructure are the main factors that influence investors' decisions. In addition, subsidies and tax incentives provided by the central government appear to impact, significantly, entrepreneurs' decisions to invest in the precise area. Because their study was conducted in an economy under crisis that has precise structural criteria and hardly attract and retain new investments. Their study could not generalised its findings in other developed countries that face similar challenges because it is very possible

the results could be different from those found in the international literature. They recommended that future research should gather qualitative data regarding the most important plant location factors and conduct their research based on improved empirical knowledge; and consider and validate the plant location factors that are used in their study.

Fusková et al., (2018) conducted this research in Slovak Republic, a country located in Europe. The aim of their study is to determine whether certain location factors are important in location decision of enterprises or not. They were able to collect data from 275 businesses in 2015 using a questionnaire survey. Those businesses were from three sectors of the national economy - primary, secondary and tertiary. In total, 67 location factors belonging to six location categories which are labour, market, land and natural resources, infrastructure, environment and law and socio-economic conditions. The findings reveals that the most significant location categories are market and labour. The sub factors that was rated as the most important sub factors are Intensity of competition in the sector, Knowledge of the local business environment and purchasing power of households. From the "labour" factors, the important sub factors are qualified workforce supply and Flexibility of the workforce. On the other hand, the factor "land and natural resources" was rated as the most irrelevant in location decision. They then suggested that a similar research can be done in different area, region, and country using the location factors identified in this study. A qualitative method can also be conducted to enrich the location decision literature.

Lumbwe et al., (2018) agreed that various factors influence a location decision, which result in good or poor business performance. Therefore, the aim of this study is to evaluate the relationship between identified location factors and SMMEs' performance city of Johannesburg, South Africa. The findings of this study shows that "Affordability of electricity tariff" had the strongest positive relationship. Due to the time constraint, a number of 56 questionnaires were collected. The reliability of the instrument was verified and a various statistical methods (descriptive and inferential methods) were used to examine the data notably Chi square ( $\chi^2$ ) and logistic regression. A gap identified in their research is the intensive review on location factors and the use of interviews to support the results of the quantitative method.

Gordon and Sved (2017) examined how two companies used Geographic Information System (GIS) technologies, which GIS providers are being used, and the advantages of using this type of software. This study aims to investigate on the factors that influence location decision of the two companies; and discussed the role of customer demographics and GIS software in selection business location. Their study only focuses on the literature discussing GIS software as well as its usage by the 2 companies and the demographics as well as general industry information about the companies involved in the study. Their research used a qualitative approach based on secondary data. The result shows that the two companies' GIS strategies, customer demographics is important in combination with the GIS software.

Mkwanazi and Mbohwa (2016a) used one of the location factors (xenophobia) to establish a research on location decision of migrants in South Africa. The aim of this research was to stimulate further extensive research in this area. Because of violent xenophobic attacks of migrants who operate their small enterprises in main townships of South Africa such as Soweto, Khayelitsha and Umlazi are not able to attract and retain migrant's small enterprises anymore. The results show that several of the migrants' enterprises had to be closed down because of those violent attacks directed to them. In addition, those townships are less attractive locations for conducting business given service delivery protest which end up as opportunities for looting and disrupting business. It was suggested that future study should be conducted on co-existence of migrant businesses and those of locals."

Cifranič (2016) conducted this research in Slovak Republic. The author focused on the importance of location factors of manufacturing companies. Therefore, the aim of the study was to identify, describe, assess and examine certain location factors for five manufacturing enterprises. The literature identifies and describes six location factors which are "labour", "market", "land", "infrastructure", "environment" and "legal social and economic conditions". The findings of this study shows that the locations sub-factors that had the highest score were "flexibility of workforce and related costs", "organization of distribution network", "size of land", "local standards for discharged dangerous substances", and "economic and social stability of the given region". On the other hand, the irrelevant sub-factors were "supply of disabled workforce", "climate conditions", and "level of the institutions and services supporting regional development".

Mkwanazi and Mbohwa (2016b) focused their study on the role of location decisions in South African Sewing Co-operatives based in Gauteng Province. They also researched on other valuable location decision strategies that can be used to improve co-operatives performance. A sample of 83 co-operatives participated in the survey. The result of this

study revealed that “operations”, “supply chain”, and “accessibility of the business location” are very important to the sewing co-operatives when choosing their location. The multiple regression analysis and factor analysis could be done because of insufficient respondents, but was recommended for future study as well as the use of mixed method which should include interviews to better understand the impact of location decision on businesses.

The study of John, Ejikeme and Alfred, (2015) examines whether there is possible relationship between enterprises locations and consumer patronage at the University of Calabar, in Nigeria. At the same time, considering the repercussions on business policy and decision makings. The objectives of this research is evaluate the impact of enterprises’ locations on repeat purchases of consumers; and assess the effect of proximity of enterprises’ locations on consumers’ patronage. The authors categorised the locations factors in two groups namely “push” and “pull” factors. Push factors include “rising competition in an area”, “rising costs”, “poor communications systems”, and “falling demand”. On the other hand pull factors refers to “government incentives”, “low labour costs”, “good communication systems”, and “developing markets”. 100 respondents participated in the study. The instrument was content-validated and the test-retest method was used to confirm the reliability. The findings revealed that location decision impact an enterprises performance; it also importantly influences the continuous purchases of consumers. In addition, location of enterprises near customers and competitors have advantages on business performance in the University. The suggestion for business policy and decision-making are that business owners must often conduct business location possibility researches.

Thumawongchai and Huang (2011) conducted their study on models and factors used for production location decisions. Their research aimed to review the literature of production location decision, particularly on models and factors regarding the manufacturing and supply chain area. Their research is based on literature databases, literature reviews and case study reports. Using existing literature, this research was able to constitute a framework categorising the current location models and factors. The framework presents the used models and factors in production location decisions. The findings revealed that dynamic and economics models within the analytic group and multi objective models within the strategic group have been practically used. From a factors view, the availability and reliability of the supply chain and availability of labour are the major factors to consider in production location decisions. Future areas of study could include other area such as luxury product, public sector, or other business area. Furthermore, evaluate the relationship between location models and location factors so that better and supported location decisions can be made.

Rajkumar (2013) seeks to investigate on the factors influencing the location decision of information technology companies in India. The result shows that seven location factors, which include manpower, technology, social, hedonistic, industrial site, economic governmental factors, and as well as their sub-factors, play significant roles in location decisions. A pilot study was conducted to understand the market and frame an effective questionnaire. The survey used a structured questionnaire for personnel from information technology organisations, government, and support service organisations. The factorised data and the constructs were further analysed using a structural equation model. These analyses and path diagram reveal new dimensions in the location decision-making process. Further study can be conducted to explore the factors influencing the location selection decision in other cities. New studies can be conducted to investigate the relationship between variables in the context of region and country.

The study of Lakshmikanthan and Tabiri (2012) is based on location factors influencing location decision making process. The research reviews the factors that impact production location decision process and also determine how the supply base and sourcing parameters affects decision making process, whether the supply base and sourcing is really considered and the impact it has in decision making process to localize a new production. Literature review and interviews were used in their study. The sample size was four companies. The major factors that are considered for production localization were discovered from the companies and practically the impact of the supply base and sourcing parameters during decision making are presented. Theoretical and empirical studies revealed that the many companies follow their own sourcing models in accordance to their core and non-core activities; however, the results based on the five companies also showed that the major location factors are considered by manufacturing firms during their production location are costs, proximity to markets/ customers, supply chain, legal issues, labour, and Capacity. Furthermore, it was discovered that supply base and sourcing is a very important factor in production location and firms must consider it as “Must” and not a “Want” in order to achieve optimal production.

The study of Minai and Lucky (2011) sought to determine the significance importance of location factor in the development of entrepreneurship and small business in Nigeria and thus suggests that location factor should be given

an urgent consideration as a vital factor that would positively affect small business performance. The research’s aim was to examine the impact of location decision as the moderating variable in the relationship between entrepreneurial factors (the individual determinants, external factors and firm characteristics) and enterprises’ performance. A pilot study was conducted on thirty owner/managers within the proximity. The descriptive analysis was then used; as well as the factor analysis. This study focused only on manufacturing and service industries in Lagos, Nigeria. Consequently, the results could not be generalised to other sectors. Furthermore, the research methods used in this research may have some limitations on the findings applicability. Based on these arguments, this study therefore recommends that future research should focus and cover the other sectors such as trading and distributive sectors.

Banard et al., (2011) examined the macro-environmental factors that affect location decisions and how these choices may affect the business performance of SMMEs. A positivistic research methodology was adopted for their study. Seven hypotheses were constructed to achieve the primary objective of this study. The population for this study consisted of SMMEs in the Nelson Mandela Metropole from which a convenience sample of 175 SMMEs participated. Their study was based on a quantitative approach and a questionnaire was developed for data collection. Cronbach Alpha coefficients were calculated to determine the reliability of the questionnaire items. Data analysis was done by calculating descriptive statistics, Pearson correlation coefficients and conducting a simple linear regression analysis. Cohen’s d was used to determine the significance of between-factor differences. The findings of the research showed that positive relationships existed between all the independent variables (location, rental rates, employment, inflation, interest rates and green buildings) and the dependent variable (business performance) except for the relationship between electricity tariffs and business performance. Employment and business performance attained the strongest positive relationship. On the other hand, the relationship between location and business performance obtained the lowest positive correlation. This study was done on a small geographical area; hence, future study should be done in a wider geographical location in order to gain a more general perspective on SMME location decisions and business performance. In addition to the recommendation for future study, more location factors should be included in the study.

### 3. Methodology

Researches from the last 10 years (2011 to 2021) were identified from the following online databases: Google Scholar, Scopus, Research gate and the University of Johannesburg database. An extensive search was performed using search words related to the research topic. The papers were carefully selected and screened further to identify 25 studies that are focused on location decision. Quantitative and qualitative publications were considered for inclusion in the study. The inclusion and exclusion criteria (see Table 2) were applied in the process of data search to acquire the chosen articles.

Table 2. Inclusion and exclusion criteria research gap

Inclusion criteria	Exclusion criteria
Research written in English	Non-English researches
Researches published from 2011 up to date.	Researches published before 2011
Researches relevant to the topic.	Researches not relevant to the topic.

The methodology emphasizes on the nature of the research, the year published, research area, the sample size, methodology, and the results and recommendations for future study. The key word used to identify relevant publications was “Location decision”, “location decision factors”, “review”. The timeframe was from 2011 to 2021. The search only focused on publications published in English that were carefully evaluated by means of titles and abstracts. Each publication identified was critically studied before deciding whether one can be incorporated in the analysis; however, publications that were not relevant to this study were not considered.

### 4. Conclusion and recommendations for future studies

Over the years, location decision has been signaled as an import strategy in operations management till now. It determine the success or failure of a business. Through the research gap analysis, it can be observed that small as well as large companies have faced location decision challenges. Therefore, the gap that future research should fill are presented as follows:

Most of the relevant paper critically reviewed have used either quantitative method or qualitative method (review papers or case studies) but not mixed method. Hence, future study should deploy the mixed method to create deeper insight, enable triangulation and corroboration: qualitative support the results of the quantitative method. In addition, the qualitative method will bring value into the understanding of how location decision affect business performance. Some studies reviewed had small sample size could not perform specific analysis. Therefore, future study should collect a larger sample size in order to apply data analysis methods such as regression analysis, multiple regression analysis or structural equation modelling.

Future studies could also assess the impact of location decision on other sectors such as public sector, other business sectors including trading and distribution sector. In addition, besides assessing the impact of location decision on other sectors, it can also be conducted on the area, region, country, or continents to compare to results of the same study in different area.

Researches previously reviewed tends to focus more on the importance of location decision factors only; however, no research focused on the satisfaction of location decision factors. Therefore, future study should analyse both level of importance and level of satisfaction to determine if there is a gap between the two variables.

Finally, it was suggested that one should conduct an exhaustive literature review on location decision as well as location decision factors that should be considered before making a location decision. This exhaustive review will unveil “modern” location factors such xenophobia and green building (Płaziak and Szymańska, 2014).

## References

- Balvers R., and Szerb, L., Location in the Hotelling duopoly model with demand uncertainty. *European Economic Review*, vol 40, no. 7, pp. 1453-1461. 1996.
- Barnard S., Kritzinger, B., and Kruger J., Location decision strategies for improving SMME business performance. *Acta Commercii*, vol 11, no. 1, pp.111-128. 2011.
- Chamberlin, E. H., The theory of monopolistic competition: A re-orientation of the theory of value. Vol. 38. Cambridge, MA: Harvard University Press. 1962.
- Chatzoglou, P., Chatzoudes, D., Petrakopoulou, Z., and Polychrou, E., Plant location factors: a field research. *OPSEARCH*, vol 55, no. (3-4), pp. 749-786. 2018.
- Cifranič, M., Localization factors in decision making of location of selected enterprises. The agrifood value chain: Challenges for natural resources management and society, pp. 305-313, 2016.
- Dubé, J., brunelle C., and legros, D., Location theories and business location decision. The Review of Regional Studies. *The Official Journal of the Southern Regional Science Association*, vol 46, no. 2, pp. 143–170, 2016.
- Farahani, H.Z., and Hekmatfar, M., Facility Location: Concepts, Models, Algorithms and Case Studies, Springer-Dordrecht, Heidelberg. (Google books), 2009.
- Fusková, M., Hanáčková, D., and Gubáňová M., Location factors and their importance in location decision making of enterprises (in conditions of Slovak republic) case study. *EMI Journal*, vol 10, no. 1, pp:5-18. ISSN: 1804-1299, 2018.
- Gordon K. M., and Sved, A. C., Business Site Selection, Location Analysis, and GIS, Degree thesis, Arcada University 2017.
- Greenhut, M., Plant Location in Theory and Practice. Chapel Hill, NC: University of North Carolina Press. 1959.
- Heizer, J., and Render, B., and Munson, C., *Operations Management: Sustainability and Supply Chain Management*, Global Edition, twelfth edition, [N.p.]: Pearson, 2016.
- Hoover, E.M., Location Theory and the Shoe and Leather Industries. Cambridge, Mass: Harvard University. 1937.
- Hoover, E.M., The location of economic activity. New York: McGraw-Hill. 1948.
- Hotelling, H., Stability in competition. *The economic journal. Springer New York*, vol 39, no. 153, pp. 41-57. 1929.
- John, E. F., Ejikeme, O. B., and Alfred, U.J., The Correlation between Business Location and Consumers Patronage: Implications for Business Policy Decisions. *British journal of economics management and trade*, vol 8, no. 4, pp. 294-304, 2015.
- Kalantari, A.H., Facility location selection for global manufacturing University of Wisconsin-Milwaukee. Master thesis. 2013
- Kats, A., More on Hotelling's stability in competition. *International Journal of Industrial Organization*, vol 13, no.1, pp. 89-93. 1995
- Lakshmikanthan J., and Tabiri, G., Factors affecting production localization in consideration with the supply base and sourcing parameters. Mälardalen University. Master Thesis. 2012.

- Launhardt, Wilhelm, *Mathematische Begründung der Volkswirtschaftslehre*, W. Engelmann, 1885.
- Lerner A. P., and Singer, H. W., Some notes on duopoly and spatial competition. *The Journal of Political Economy*, vol 45, no. 2, pp. 145-186. 1937
- Lösch, A., *The Economics of Location*, Yale University Press, New Haven, orig. edn. (1940), *Die Räumliche Ordnung der Wirtschaft*, Gustav Fischer, Jena.
- Lumbwe, A.K, Nwobodo-Anyadiegwu, E, and Mbohwa C. The importance and satisfaction of location decision factors of South African manufacturing and service SMMES: An Exploratory Factor Analysis. *Proceedings of the 11th Annual International Conference on Industrial Engineering and Operations Management Singapore*, March 7-11, 2021
- Lumbwe, A.K., Nwobodo-Anyadiegwu, E., Mbohwa, C., The impact of Location decision on Small, Micro, and Medium Enterprises' performance in Johannesburg". *Proceedings of the International Conference on Industrial and Operations management*, Paris, France, July 26-27, pp: 1205-1216, 2018
- Mbugua, J.N., Factors influencing business choice by small and medium sized enterprises in motor spares businesses along kirinyaga road in Nairobi, 2011.
- Minai M. S., and Lucky, E. O. I., The Conceptual Framework of the Effect of Location on Performance of Small Firms. *Asian social science*, vol, 7, no. 12, pp: 110-118. 2011.
- Mkwanazi S., and Mbohwa, C., A Township based business location for migrant's businesses in South Africa: Cases of Xenophobia. 2016a.
- Mkwanazi, S., and Mbohwa, C., Location strategies to improve the operational and business performance of funded Sewing co-operatives in Gauteng. Available at: [https://ujcontent.uj.ac.za/vital/access/manager/index?site\\_name=research%20Output](https://ujcontent.uj.ac.za/vital/access/manager/index?site_name=research%20Output). 2016b.
- Ohlin, B., *Interregional and International Trade*. Cambridge, Mass. Harvard University Press. 1935.
- Ohlin, B., *Interregional and International Trade*. Cambridge, Mass. Harvard University Press. 1952.
- Plaziak M., and Szymańska, A. I., Role of modern factors in the process of choosing a location of an enterprise. *Procedia-Social and Behavioral Sciences*, vol 120, pp.72-83, 2014.
- Rajkumar, P., A study of the factors influencing the location selection decisions of information technology firms. *Asian Academy of Management Journal*, vol 18, no. 1, pp. 35–54. 2013.
- Sholihuddin, M.A., Rivai, A. and Saragih, B., 2020. The Effect of Location and Price on Consumer Satisfaction through Buying Decisions on PT. Adhi Persada Property.
- Smithies, A., Optimum location in spatial competition. *The Journal of Political Economy*. Vol 49, no. 3, pp. 423-439. 1941.
- Thumawongchai, V., and Huang L., Models and factors used for production location decisions: a review and categorizing framework". Mälardalen University Sweden. Master Dissertation. 2011.
- Thünen, J. H., *Der isolierte Staat in Beziehung auf Landwirtschaft und Nationalökonomie*. Aufl, Teil I. Berlin, 1875.
- Weber, A., *Theory of the Location of Industries*. Ed. Carl Joachim Friedrich. Chicago: University of Chicago Press. 1929.
- Yang, J., and Lee, H., An AHP Decision Model for Facility Location Selection, vol 15, no 9/10, pp. 241–25, 1997.

## Biographies

**Alice Lumbwe Kabamba** is a Masters student with the faculty of Engineering and Built Environment at the University of Johannesburg, South Africa. She has a national diploma (with distinction) and Bachelor of Technology (with distinction) in Operations management. Her research interests are in quantitative techniques, project management, and operations management.

**Eveth Nkeiruka Nwobodo-Anyadiegwu** is a lecturer and doctoral student with the Faculty of Engineering and Build Environment at the University of Johannesburg, South Africa. Her research interests are in continuous improvement in healthcare operations, operational excellence, operations research application, project management, engineering education, and has published more than 20 academic papers.

**Prof. Charles Mbohwa** is a Professor at the University of Johannesburg. He has a D Eng. from Tokyo Metropolitan Institute of Technology, MSc in Operations Management and Manufacturing Systems from the University of Nottingham and a BSc (honors) in Mechanical Engineering from the University of Zimbabwe. Prof. Mbohwa has been a British Council Scholar, Japan Foundation Fellow, a Heiwa Nakajima Fellow, a Kubota Foundation Fellow and a Fulbright Fellow. His research interests are in operations management, engineering management, project management, energy systems and sustainability assessment. He has published books and more than 500 academic papers.

