Shipping to a landlocked country: maritime port choice decision from a consignee's perspective

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Abstract: For consignees in resource-constrained landlocked countries, selecting the ideal gateway port for their shipments is an important decision in getting their goods delivered efficiently. Using an example of Malawi, the gateway port selection decision-making process is studied in this paper. Five decision-making criteria are identified and analysed using the analytical hierarchy process (AHP). Besides the initial criteria, other factors supporting the consignees' preference for Dar es Salaam Port are also identified. This study can contribute to stakeholders' decision-making in improving port efficiency, infrastructure development planning, streamlining policies, and service delivery, among others to effectively improve the attractiveness of their ports against existing competition.

Keywords: port selection; analytical hierarchy process; AHP; transportation challenges; group decision-making; landlocked transportation.

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1   Background

By some estimates, the used car market around the world is worth around $70 billion. Developing countries including Malawi and other African countries are some of the biggest markets for used motor vehicles from Japan in particular because of the vehicles' reputation for reliability, low maintenance costs, and affordability. In some countries, as much as 90% of vehicles are imported second-hand. An important detail on what limits the trade is that some countries such as Malawi have lesser stringent regulatory standards

on used car imports than say, South Africa for example-whose regulations aim to protect the local car industry (Brooks, 2012). Other major limitations include tariffs and the age of the vehicles. For Malawi, official statistics are hard to come by, but the dominance of used Japanese vehicles is easily verifiable through observation and evidence-based reports such as Ariadne (2018). The general distribution of the used vehicle market in Africa according to the place of origin is illustrated in Figure 1.

Figure 1   Vehicle import distribution by the place of origin (see online version for colours)
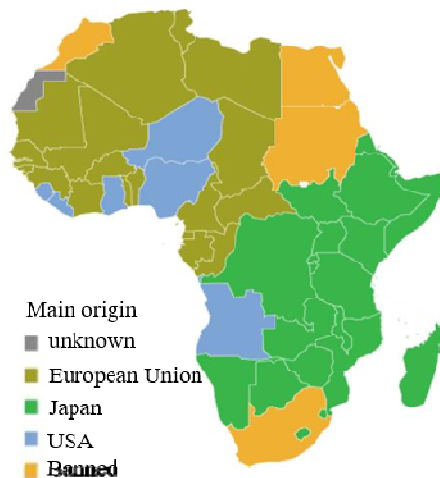
Source: Ariadne (2018)

Malawi does not have a maritime port and depends entirely on the regional coastal neighbours Tanzania, South Africa, Mozambique, and Namibia, among others for transit and access to the global maritime shipping network through their ports. These transit countries each have unique characteristics including different levels of economic, political, and infrastructure development. The aforementioned differences create a unique environment for doing business in or with any of them. Each presents advantages and challenges that influence the determining factors associated with the use of their maritime ports by landlocked countries. Considering the different characteristics of the coastal countries, businesses and individuals intending to import or export goods overseas using maritime transport have to make the significant decision of choosing which, of the available maritime ports is the most ideal.

The objective of this paper is to evaluate the perceived competitiveness of the selected maritime ports which influences port selection decisions based on the consignee's demands, particularly for importing motor vehicles to landlocked Malawi. One of the most significant data in any industry is the consumer or end-user feedback given in various forms, which contributes to establishing user perception and identifying areas that need adjustments to facilitate better products and service delivery. Effectively, the regional ports concerned and other stakeholders can use such studies to improve on specific areas that could make their ports more attractive to importers of specific goods such as motor vehicles. This and similar studies can play a role in informing decision-makers on, for example, planning infrastructure development and service

expansion to further streamline the vehicle-import processes in the long term. It is particularly significant for landlocked countries which often have serious resource constraints. While real-time data on imported vehicles at entry points offers immediate statistical insights and projections, additional understanding of why users make their decisions for well-informed deliberation of long-term plans since perception and loyalty are most likely to remain unchanged over extended periods, highlighting the significance of this study. In addition to its practical approach, this paper contributes to the limited literature on the subject, especially concerning the landlocked countries in Africa.

Through a survey with both commercial and private consignees, five factors are identified as critical in gateway port-selection decisions in this paper. To establish the weights of the criteria relative to each other, the criteria are computed using the analytic hierarchy process (AHP). Furthermore, the decision-making criteria weights established are used to compute the ranks of the available gateway port alternatives to achieve the goal of selecting the ideal port.

2   Literature review

2.1   *The determinants of the port selection decision*

Port selection decision studies typically involve shipping lines, freight forwarders, shippers, port authorities, logistics service providers, and consignees (Ding, 2007), and apply different methods depending on the perspective and purpose of an evaluation.

From the shippers' perspective, for example, important determinants include the distance between the location of a cargo port and the location of the exporter of cargo; the time that cargo remains in port; port prices charged for port cargo services; frequency of port cargo ship calls and; the number of destination cargo ports served by cargo ships calling a port (Talley, 2009). Ugbona et al. (2006) used AHP in their study to establish an understanding of the relevance of individual factors that shippers consider when selecting transhipment ports in Nigeria. It suggested that shippers placed more importance on port efficiency, frequency of ship visits, and adequate infrastructure than they did on the speed of response to port users' needs. From the global perspective, Lirn et al. (2004) applied the AHP methodology to study the problem of transhipment port selection by international container carriers concerning the relevant industry service attributes to establish a possible focal point for transhipment market strategy. The handling cost of containers, proximity of main navigation routes, proximity to import/export areas, infrastructure condition, and existing feeder network were identified as important determinants in the global container terminal industry.

Tongzon (2009) evaluated the process and style of decision-making from a Southeast Asian perspective and further discussed policy implications for port operators and authorities. The study from the perspective of freight forwarders suggested that factors including high port efficiency, good geographical location, low port charges, adequate infrastructure, a wide range of port services, connectivity to other ports, adequate infrastructure, and others are important in the port selection process.

Acquah (2018) performed an analysis using the data envelopment analysis (DEA) method to evaluate the operational efficiency of gateway ports to landlocked countries in the West African region. The computed input variables in that study included total quay length, terminal area, total quayside cranes, the total number of yard gantry cranes, and

the total number of reach stackers while the output variable was the container throughput based on data covering eight years. One of the key points linking that study to this paper is how language traditionally biased the port choice decision by the three French-speaking landlocked countries in the region namely Burkina Faso, Mali, and Niger to the ports in francophone coastal countries in the region. Nevertheless, based on operational efficiency and computation using the aforementioned variables, the port of Tema in Anglophonic Ghana and the port of Abidjan in the French-speaking Ivory Coast emerged as the most efficient gateways for the landlocked countries while the port of Cotonou in Francophonic Benin was the least efficient out of the six alternatives analysed in that study.

Before Acquah (2018), Vandyck and Ismael (2015) had also evaluated ports in the same region using the AHP approach to establish a different outcome. Although the latter did not analyse the efficiency of the ports for acting as gateways to the landlocked countries as Acquah (2018) did, the analysis is in principle, based on similar port performance attributes which by using the base year 2012 indicate that the port of Abidjan was the most competitive followed by the ports of Lome, Tema, Dakar, and Lagos, respectively.

In a similar study on the best gateway for the landlocked countries in the West African region, Vandyck and Domfeh (2017) assessed the total cost of transportation. Using forecasted demand, the study found that the Port of Abidjan offered the lowest transport costs in the medium to long term. However, using historical data, the Port of Tema offered the lowest inland transport costs to shippers in landlocked West Africa. In many ways, the two ports remain dominant in the region.

Owing to the availability of port facilities due to the rapid globalisation of logistics, Park and Min (2011) sought to simplify the increasingly complex problem of selecting the most suitable port among the numerous alternatives available. Thus, they proposed a hybrid DEA/AHP model whose application was illustrated using key maritime hub ports in far east Asia. Four important factors were identified: intermodal links, proximity to major shipping routes, container handling cost, and carrier bargaining opportunity. Sayareh and Alizminib (2014) focused on establishing the optimum container port for shipping lines in the Persian Gulf using a hybrid of AHP and TOPSIS, obtaining the significant criteria: working time, stevedoring rate, safety, port entrance, sufficient draft, the capacity of port facilities, operating cost, number of berths, ship channelling, and international policies.

From the hinterland transportation perspective, Talley (2019) departed from the general studies of port choice by users to investigate the determinants of the choice of a cargo port service chain by cargo port and hinterland transportation service providers. It established that the determinants of these choices are revenues obtained from port services and hinterland transportation services, respectively.

The port selection decision-making factors come down to the port's efficiency and performance against the competition, regardless of the perspective of an evaluation. A great illustration of this relationship is how the Cameroonian port of Doula fails to compete with other ports in the West African region due to inefficiencies attributed to poor hinterland links, outdated machinery, poor infrastructure, inadequate shipping services, high custom fees, among others, as established by Balla et al. (2016). It is not surprising that the port is noticeably not among the ranks of top performers and most

preferred ports in the region according to evaluations conducted by Acquah (2018) and Vandyck and Ismael (2015).

For vehicle importation, Choi (2011) applied AHP to analyse the determinants for selecting the Korean Port of Pyeongtaek. According to car importers, the most important determinant for selecting the port was the port's location followed by cost, facility, service, marketing, and cargo volume, in descending order of significance.

Da Cruz et al. (2013) used an AHP model to evaluate seaport competitiveness from the perspective of stakeholders. Mittal and McClung (2017) analysed the shippers' changing priorities in the port selection decision. Guy and Urli (2006) studied the rationale of port selection by shipping lines. Different approaches to port selection can also be found in Aronietis et al. (2010), and Kurt et al. (2015). There are other studies relevant to port selection but focused specifically on port performance and competition analysis (Feng et al., 2012; Parola et al., 2017; Veldman and Bückmann, 2003).

Despite the noticeable growth of the second-hand car trade in the African continent, there is surprisingly very little in terms of academic research on the subject. The revenues generated by this trade have helped to improve port performance and inspired infrastructure development, among other contributions. Essoh (2013) attributed the improved efficiency of the Ivorian port of Abidjan to the increased trade of used vehicles in the West African region and competition from other transit ports of Lome and Cotonou in Togo and Benin, respectively.

It is evident from the studies that the composition of the port selection decision-making determinants is very related to performance (see literature summary in Table 1), and that the determinants for the ideal port selected by a stakeholder depend on the perception and purpose of evaluation.

Table 1   Relationship between port selection literature and this study

Component	In literature	This study
Determinants	Proximity to main transport routes, hinterland transportation networks, operation performance, cost, port management, geographical location, transit time, frequency, quality of service, values, and perceptions, inter-modal connections	Distance, time, accessibility, cost, service quality
Perspective	Shipping lines, freight forwarders, shippers, port authorities, logistics service providers, and consignees	Consignees
Methodology	Analytical hierarchy process, data envelopment analysis, technique for order of preference by similarity to ideal solution	Analytical hierarchy process

Many of the studies reviewed concentrate on the port choice decision in coastal countries with well-established port facilities and alternatives. Regardless of the final destination of shipments (coastal or landlocked), the determining factors for port selection come from within the set of global port selection determinants which are very much linked to port performance (see Table 1). The key difference is the consideration of distance from the port, and border crossings which often translates to extra costs. To the knowledge of the authors, although there are several studies on port selection, especially in West Africa, there are no studies on the port selection subject and specifically for the importation of vehicles to landlocked countries in southern Africa or indeed Africa in general.

3   Maritime connectivity to landlocked Malawi

Owing to the lack of direct access to the sea, for landlocked countries such as Malawi shipping usually means the switch to an inland mode of transportation such as railway and road to final hinterland destinations. For vehicles whose final destination is Malawi, the journey from the port of discharge means a long drive as the use of vehicle carriers is minimal if ever.

Malawi is one of the 16 landlocked countries[1] in Africa and depends on its coastal neighbours for all overseas imports and exports that do not come directly through air transport. The ports discussed in this study are Beira in Mozambique, Dar es Salaam in Tanzania, and Durban in South Africa which were selected on the basis that they are listed as ports of discharge options for Malawi-bound vehicles by the key used-motor vehicle dealers and agents researched for this study.

3.1   Port of Beira, Mozambique

The City of Beira is the third-largest city in Mozambique and the port of Beira is an essential gateway for shipping and logistics to neighbouring countries including Zimbabwe, Zambia, Botswana, Malawi, and the Democratic Republic of Congo (DRC). The port, under the management of Cornelder de Mozambique (CdM), links to the aforementioned countries by the means of road, rail, and pipeline.[2] The port of Beira is the second-largest in Mozambique with a total berth length of 1,994 metres, 11 berths, and a fishing harbour. It comprises a multi-purpose container terminal that covers 670 meters, and a multi-purpose cargo terminal that covers 645 meters berth length with projected capacities of 400,000 TEUs[3], and an estimated 6.6 million tons, annually. Other facilities include bulk liquids, grain, and coal terminals (*American Journal of Transportation*, 2021).

3.2   Port of Dar es Salaam, Tanzania

Administered and managed by the government of Tanzania through Tanzania Port Authority (TPA), the port of Dar es Salaam port handles an estimated 95% of Tanzania's international trade. It has a rated capacity of ten million tons of which, about four million tons is general cargo including 9,619,876 TEUs, and about six million liquid bulk cargo. The port has a total quay length of about 2,600 meters with 11 deep-water berths. Key port facilities include a general cargo terminal, container terminal, grain terminal, oil terminal, and storage areas (Tanzania Ports Authority, 2017). The port serves the landlocked countries of Malawi, Zambia, the DRC, Burundi, Rwanda, and Uganda. The transportation networks from the port to the hinterland include an integrated rail/ferry system to the Tanzanian lake port of Kigoma on Lake Tanganyika, connecting to Bujumbura, Burundi; Kalemie and Uvira, Congo; a railway line to Zambia, the DRC, and Zimbabwe via the cape gauge (3ft. 6ins.) TAZARA railway system; and road networks connecting to the countries that are served by the port.

3.3   Port of Durban, South Africa

One of the top ten busiest ports in Africa, the port of Durban is strategically located to handle container, automotive, break-bulk, dry, and liquid bulk cargo shipping, among

others totalling about 31 million tons each year. Durban has a harbour entrance depth of 19 metres, a quay length of 2,128 metres, 14 ship-to-shore gantry cranes, and 58 berths for the different types of vessels that call the port. The port handled approximately 4.4 million TEUs in 2021 according to its operator (Transnet, 2022). Apart from South Africa, the port its robust land transport connectivity is also crucial for shipments to and from the nearby landlocked countries including Eswatini, Lesotho, Zimbabwe, Botswana, Zambia, and Malawi.

3.4   *Characteristics of routes between Malawi and regional ports*

Malawi shares land borders with three countries: Tanzania to the north and northeast; Mozambique to the east, south, and southwest; and, Zambia to the west. The shipping routes from regional ports to Malawi are shown on the map in Figure 2 and throughout the discussion, Lilongwe, the capital city of Malawi is the reference point because of its generally central geographical position although it must be noted the consignees might also be in other regions of the country.

Figure 2   Malawi gateway port network for vehicles (map not drawn to scale) (see online version for colours)

The routes between Malawi and gateway ports, which form a hub-and-spoke[4] topology, have attributes as shown in Table 2. The attributes are based on recommended 'shortest' driving routes[5] and computation using GPS coordinates (DD) of the connected cities. The distances are very important because rather than using car carriers, vehicles are generally driven from the ports to the consignee.

Table 2   Route attributes between Malawi and regional maritime ports

	Dar Es Salaam-Lilongwe	*Beira-Lilongwe*	*Durban-Lilongwe*
GPS distance	1,001.30 km	658.94 km	1,785.87 km
Driving distance	1,540 km	970 km	2,451 km
Border crossings	1	1	3 (via Zimbabwe and Mozambique)

4   Gateway port selection

With regards to shipping a used vehicle from overseas, key things to consider include the shipping mode and the port of discharge. Generally, across all importing agencies, there are two shipping options for motor vehicles namely: roll-on/roll-off (ro-ro) and container shipping. In international sea freight shipping, ro-ro is the transportation of wheeled cargo which is driven onto and off the vessel. Container shipping options are available in full or shared containers depending on the volume of the vehicle. While the choice of the mode of shipment is straightforward and primarily based on cost, there are many factors involved in the selection of the port of discharge.

4.1   Criteria determination and evaluation framework

4.1.1   Respondents' profile

Three surveys were conducted within the non-representative sample of individuals who imported vehicles using the port alternatives in this study. The three surveys aimed to establish port choice criteria, evaluate criteria importance and establish alternative preferences, respectively.

A total of 932 individuals who imported vehicles in the past five years participated in a survey to determine the general factors they considered for the importation of their vehicles. Out of those, 45 were identified as traders who have experience using all the ports discussed in the study at least once for the importation- a prerequisite for the expert input. From the group, a total of 271 individuals who imported their vehicles within the past two years were asked to participate in the port preference part of the survey as summarised in Table 3.

Table 3   Summary of respondents

Goal	Group	Respondents/932
Criteria determination	Imported in the past < 5 years	932
Criteria evaluation	Frequent importer	45
Alternative preference	Imported in the past < 2 years	271

4.1.2   Definition of criteria

From the initial survey, the following criteria were identified based on the judgment and experience of the consignees, attributed to the literature, and defined as follows:

C1 (distance)   the length of the way from the port of discharge to the final destination.

C2 (time)   the length of the duration between the arrival of the vessel and the car leaving the port of discharge. Ports around the world all have different cargo flow rates determined by the efficiency of the individual ports.

C3 (service quality)   the overall perception of the quality of service rendered by the ports with regards to the assistance during transactions.

C4 (accessibility)   the ease with which clients can reach a gateway port and inland transit routes.

C5 (cost)   the overall expenses associated with using a particular gateway port.

A hierarchy for analysis was developed to evaluate the given set of criteria against available port alternatives with the goal of port selection as illustrated in Figure 3.

Figure 3   AHP evaluation framework
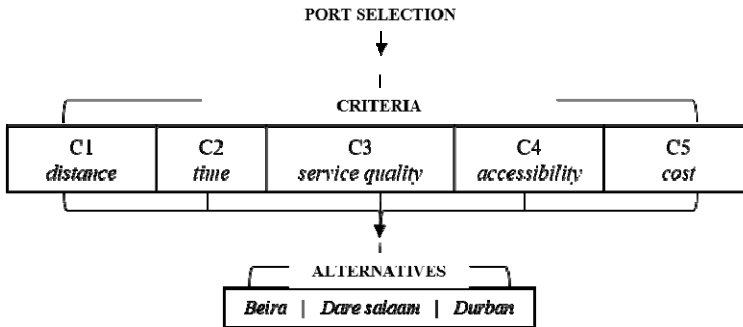
4.2   Results and discussion

4.2.1   Criteria priority evaluation

The relative importance of the criteria is judged based on the Saaty rating scale (Table 4), a significant tool in the AHP analysis.

Table 4   The Saaty rating scale for AHP

Intensity	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective
3	Somewhat more important	Experience and judgment favour one over the other
5	Much more important	Experience and judgment favour one over the other.
7	Very much important	Strongly favour one over the other
9	Absolutely important	Favouring one over the other is of the highest possible validity.
*2, 4, 6, 8	Intermediate values	compromise is needed

Based on the number of criteria observed (n = 5), a 5 × 5 pair wise comparison matrix is constructed and the initial criteria expert values are presented in Table 5.

The relative weight of each factor is determined by priority values (eigenvectors), which are the average of normalised criteria values. Normalised values are obtained by dividing each value by the column total value and the results are shown in Table 6.

Table 5   Pairwise comparison of decision-making factors

	C1	C2	C3	C4	C5
C1	1.000	3.000	4.000	2.000	0.500
C2	0.333	1.000	0.500	0.500	0.200
C3	0.250	2.000	1.000	0.500	0.333
C4	0.500	2.000	2.000	1.000	0.333
C5	2.000	5.000	3.000	3.000	1.000
Sum	4.083	13.000	10.500	7.000	2.367

Table 6   Weighted matrix of the normalised pairwise comparison

	C1	C2	C3	C4	C5	*weight*
C1	0.245	0.231	0.381	0.286	0.211	0.271
C2	0.082	0.077	0.048	0.071	0.085	0.072
C3	0.061	0.154	0.095	0.071	0.141	0.105
C4	0.122	0.154	0.190	0.143	0.141	0.150
Cost	0.490	0.385	0.286	0.429	0.423	0.402

The consistency index (CI) of the decision-making matrix is calculated using the formula;

$$CI = \frac{\lambda_{\max} - n}{n - 1} \tag{1}$$

where the maximum eigenvector ($\lambda_{\max}$) is the product of the Eigenvector and the column sum of unnormalised values for each criterion, and n is the total number of criteria being compared. Thus;

$$\lambda_{\max} = 5.147 \tag{2}$$

$$CI = \frac{\lambda_{\max} - n}{n - 1} = \frac{5.147 - 5}{5 - 1} = \frac{0.147}{4} = 0.037 \tag{3}$$

To verify the adequacy of the *CI* value, the ratio of *CI* to the random index (*RI*) suggested by Saaty is computed (Donegan and Dodd, 1991). *RI* is based on predetermined values as partially presented in Table 7. A matrix will be considered consistent if the resulting ratio is less than 10%, generally expressed as:

$$CR = CI / RI < 0.1 \sim 10\% \tag{4}$$

$$CR = \frac{CI}{RI} = \frac{0.037}{1.12} = 0.033 = 3.28\% \tag{5}$$

Table 7   Saaty's random index scale

N	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
RI	0	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49

Since the value CR = 3.28% satisfies the condition $CR < 0.1 \sim 10\%$, the consistency of the matrix is therefore acceptable. The final perceived order of importance of criteria relative to each other in the decision-making process has been illustrated in Figure 4.

Figure 4   Decision criteria priority hierarchy (see online version for colours)
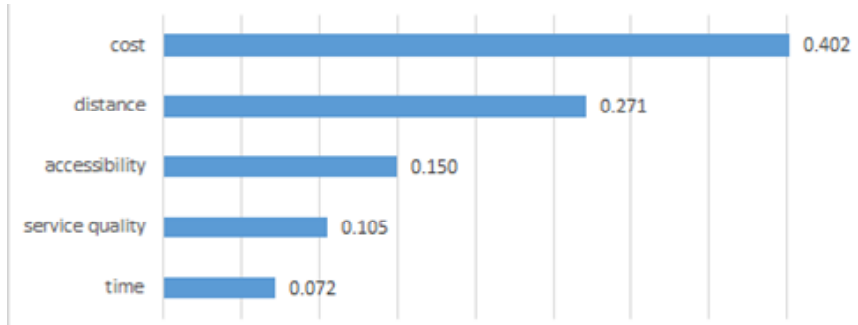
4.2.2 Evaluation of alternatives

After establishing the weights of the criteria, the next stage is to use the criteria to rank the available alternatives against each criterion based on linguistic terms linked to a numerical scale, 1 for lowest and 5 highest in the benefit attributes and inverted in the cost attributes. Cost attributes are the criteria elements that need minimising, (i.e., the less the better including time, distance and cost) while benefit criteria are those that need maximising, (i.e., the more the better including service quality and accessibility).

Table 8   Initial matrix for alternatives

Port/criteria	C1	C2	C3	C4	C5
Beira	4.00	2.64	1.81	2.84	3.00
Dare salaam	3.00	1.00	5.00	4.00	4.00
Durban	1.00	2.00	4.00	1.00	1.00
Sum	8.00	5.64	10.81	7.84	8.00

Table 8 shows the initial matrix developed from criteria scoring and the normalised values are displayed in Table 9 as follows:

Table 9   Normalised matrix for alternatives

Beira	0.500	0.468	0.167	0.362	0.375
Dare salaam	0.375	0.177	0.463	0.510	0.500
Durban	0.125	0.355	0.370	0.128	0.125

Table 10   Alternative ranking

| Beira	0.392	2
Dare salaam	0.440	1
Durban	0.168	3

The scores for the alternatives are then summed up to establish the final ranking as shown in Table 10.

4.2.3 Discussion of results

Of the five criteria used in this study, the cost factor is given the highest priority followed by distance, accessibility, service quality, and time by decision-makers as illustrated in Figure 4. In contrast with Choi (2011) on the subject of port selection criteria for vehicle importation, the most important determinant was the location, followed by the cost factor, facility, service, marketing, and cargo volume of the port of Pyeongtaek. This is one example of the close association of the different criteria regardless of whether the decision is being made in a coastal or landlocked country considering that Korea is a maritime country. Similarly, the alternatives with the lowest inland transportation costs in the West African region together with their competitive efficiency as alluded to by both Vandyck and Domfeh (2017) and Acquah (2018) proved to be the most attractive to consignees. This confirms the significance of the cost factor, in its different aspects in the port selection.

For the five criteria of evaluation, the alternatives' normalised scores are summarised in Figure 5. The port of Beira scored the highest in the distance criterion for its proximity to Malawi, especially to destinations in the South and centre of the destination country while the Tanzanian Port of Dare Salaam topped the scoring in the service quality, accessibility, and the overall cost associated with using that particular port and the final alternative of Durban in South Africa scored the highest in the service quality criterion. This study argues that language is one of the most important determinants of the perceived low service for Beira as expounded upon in Section 4.3.

Figure 5 Alternative scores by criteria (see online version for colours)
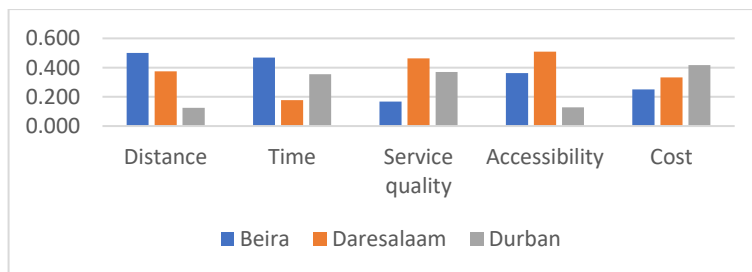
Generally, the distance and border crossings between maritime ports and some landlocked countries are much greater than in others, which could make distance a superior decision-making factor. Political instability in some regions could make access to ports or transit routes difficult for some landlocked African countries, effectively making accessibility an important component and so forth. Such being the case, similar studies might need adjustments and even additional criteria to obtain more realistic results.

Unlike landlocked countries, coastal countries are known to enjoy the benefits of sea-borne trade which contributes to their economic prosperity. Although consignees located further inland in larger coastal countries also have to make port selection decisions similar comparable to the landlocked countries, they often enjoy better

connectivity with the ports and better infrastructure than landlocked countries- even when they are using the same ports. This is attributed to the economic benefits of maritime connectivity which translates to resource availability and effectively, better infrastructure and service delivery domestically. Therefore, what constitutes each decision-making factor, the cost for example in a landlocked country will vary significantly and not be directly comparable to the same in a coastal country.

4.3   Rationale of preference

From the initial 932, a group of 271 consignees who have imported cars in the past two years was chosen to further explain which specific gateway ports they used to import their cars and the key reason for their decision. The period of two years was used to capture the experience based on the nearest to the present conditions. Out of the 271 individuals interviewed, 93.36% said they had used the port of Dare Salaam, 3.69% the port of Beira, and 2.95%, the Port of Durban. While the Port of Beira is seemingly a strong contender in the criteria rankings, the perceived quality of service delivery significantly influences the decision-making concerning using the port. The perception of service delivery arguably centres around the differences in languages spoken in the two countries, Portuguese in Mozambique and English in Malawi linked to the countries' colonial past. For many, it complicates not only the services at the ports but also along the transit routes during police checks and border crossing processes. Other factors outside the core criteria discussed in this study were observed as follows:

4.3.1   Security

Concerns over the safety and security of transiting through Mozambique have grown, especially since the rise of terrorist attacks in some parts of the country and most notably in Cabo Delgado Province (Stanyard et al., 2022). Although the attacks were in regions far away from the Port of Beira, the news of the attacks was enough to dissuade customers from considering the port or its more efficient alternative, Nacala Port.

Similarly, security risks associated with transiting through South Africa discussed by Mlepo (2022) were also identified as an important reason why buyers entirely avoid the use of the Durban port as a gateway despite the many advantages associated with the port and the country's robust transport infrastructure, in general. The percentage of buyers who used the South African port said they only did because they either had family or business interests in the port city or nearby cities and were very familiar with the country.

While security challenges to transportation are not particularly new, the southern African region is known for its record of peace compared to other African regions hence the implications are very significant. The increase in extremist threats and other criminal activities that target people and cargo means that many do not want to risk getting caught up in the chaos and therefore avoid using the ports in the affected countries altogether. Although the situation in the region might temporarily be under control, the threat remains unpredictable.

4.3.2   The bandwagon effect

Indeed, to an extent, all buyers considered the basics of importing a motor vehicle such as cost and time. However, with regards to deciding which port to use, 76.68% of the

individual buyers who used the port of Dare Salaam either did not even consider any other alternative or did not know they could use other ports besides Dare Salaam. They use the port of Dare Salaam because that's a general perception that it is what everyone is using. Many private freight forwarders have established offices on either side of the border to facilitate the transit of vehicles for clients. Informal middlemen drive vehicles from the port, undertaking the clearance tasks and delivering them to their new owners.

5   Conclusions

From the AHP analysis, it has been established that; consignees in Malawi put the highest priority on the overall costs associated with using a particular port as a gateway for the importation of used motor vehicles originating in Japan. The importance of cost is supported by the well-documented financial constraints of the customers who usually need to save up for some time ahead of their purchase. This means, that people generally look for the cheapest available option to get their vehicle to the final destination before they start to look at the other determinants. Dare Salaam is established as the preferred gateway port for the importation of second-hand vehicles into Malawi for its perceived balance of the key five factors considered. The sustained choice of the port can be attributed to other factors including the bandwagon effect and emerging challenges associated with the alternative Beira and Durban.

The preferences of the consignees in this study can help to establish how the coastal countries can increase the attractiveness of their ports for the importation of vehicles destined for landlocked Malawi. Changes to policy and agreements between coastal and landlocked countries, fee adjustments, staff training, security and safety enhancements, and improvement of port efficiency could contribute to the attractiveness of some ports if implemented. In the long-run, rehabilitation of existing railway lines and the development of new lines to improve direct port connectivity through freight trains could significantly reduce costs for importers and further promote trade for the landlocked country. The development of such infrastructure, however, could be beset by the associated costs as well as the volume and value of exports from Malawi.

Without a universal set of criteria and the differences in purpose and methods of evaluation, it is highly expected that results will differ in various degrees from country to country, region to region, regardless of being landlocked or coastal, but the general principles remain the same.

Going forward, studies could be conducted to evaluate and compare the efficiency of the regional ports for containerised cargo from ports to landlocked countries.

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Notes

1 The other landlocked countries in Africa are: Burundi, Botswana, Burkina Faso, Chad, Ethiopia, Eswatini, Niger, Rwanda, Uganda, Central African Republic, Lesotho, Mali, Zambia, Zimbabwe, and South Sudan.

2 The Companhiado De Pipeline Mozambique-Zimbabwe (CPMZ) fuel pipeline runs from Beira to the capital of Zimbabwe, Harare.

3 Handling estimates for 2017 is 200, 000 TEUs (*AJOT*, 2017).

4 Networks where peripheral nodes are connected to a central node; the hub (Rodrigue and Ducruet, 2020).

5 Shortest distance route generated by Google Maps.