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Inclusion of warehousing and distribution in the Cape functional region's spatial plans

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Research article

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Abstract

Processes of logistics, which facilitate the flow of goods, are crucial in contemporary economies. Largely responsible for the physical distribution component of logistics, warehousing and distribution (W&D) facilities are pertinent to urban and regional planning because they are, *inter alia*, the most space-extensive component of logistics and supply chain. Despite the importance of logistics, the regulation of the location of logistics facilities has been insufficient because of the poor relationship between logistics planning and urban policy. Using the study area of the Cape functional region, the article aims to analyse the inclusion of W&D in the spatial plans. The study was based on qualitative interviews conducted with nine urban and regional planners as well as content analysis of the applicable spatial development frameworks (SDFs). It was discovered that the SDFs in the region do not sufficiently address W&D. It is, therefore, recommended that policymakers as well as urban and regional planners align policy documents to facilitate the development of W&D facilities. It is also recommended that policy documents be informed by the intricacies of W&D instead of merely being based on broad industrial land use.

Keywords: Logistics, supply chain, spatial development framework, spatial planning, warehousing and distribution, Cape functional region, City of Cape Town, Stellenbosch, Drakenstein

INSLUITING VAN PAKHUISE EN VERSPREIDING IN DIE KAAPSE FUNKSIONELE STREEK SE RUIMTELIKE PLANNE

Logistiese prosesse, wat die vloei van goedere vergemaklik, is deurslaggewend in hedendaagse ekonomieë. Grootliks verantwoordelik vir die fisiese verspreidingskomponent van logistiek, is pakhuisse en verspreiding (W&D) fasiliteite toepaslik vir stads- en streekbeplanning omdat dit onder andere die mees spasieomvattende-komponent van logistiek en die voorsieningsketting is. Ten spyte van die belangrikheid van logistiek, was die regulering van die ligging van logistieke

fasiliteite onvoldoende as gevolg van die swak verhouding tussen logistieke beplanning en stedelike beleid. Die artikel ten doel om die insluiting van W&D in die ruimtelike planne van die Kaapse funksionele streek te ontleed. Die studie is gebaseer op kwalitatiewe onderhoude wat met nege stads- en streekbeplanners gevoer is, asook inhoudsontleding van die toepaslike ruimtelike ontwikkelingsraamwerke (ROR's). Daar is bevind dat die SDF's in die streek nie W&D voldoende aanspreek nie. Dit word dus aanbeveel dat beleidmakers sowel as stads- en streekbeplanners beleidsdokumente in lyn bring om die ontwikkeling van W&D-fasiliteite te fasiliteer. Dit word ook aanbeveel dat beleidsdokumente ingelig word deur die ingewikkeldhede van W&D in plaas daarvan om bloot op breë industriële grondgebruik gebaseer te word.

Sleutelwoorde: Logistiek, voorsieningsketting, ruimtelike ontwikkelingsraamwerk, ruimtelike beplanning, pakhuisse en verspreiding, Kaapse funksionele streek, Kaapstad, Stellenbosch, Drakenstein

KENYELLETSO EA MEAHO EA POLOKELO LE KABO EA LIHLAHISOA MERALONG EA LIBAKA KAPA

Mekhoa ea tsamaiso ea thepa, e nolofatsang phallo ea lihlaisoa, e bohlokoa haholo moruong oa sejoale-joale. Kaha meaho ea polokelo le kabo (W&D) li na le boikarabello bo boholo tsamaisong ea lihlahisoa, e bohlokoa therong ea litoropo le libaka hobane har'a tse ling, ke karolo ea phepelo e hlokang tšebeliso e pharalletseng ea mobu kapa tsona libaka. Ho sa tsotellehe bohlokoa ba tsamaiso le kabo ea thepa le lihlahisoa, thlokeho ea likamano pakeng tsa therelo ea thepa le lihlahisoa, le maano a litoropo, e bakile bofokoli taolong ea libaka tsa kabo ena. Ka tšebeliso ea sebaka sa boithuto sa Kapa, sengoloa se ikemiselitse ho sekaseka ho kenyelletsoa ha W&D meralong ea libaka. Boithuto bona bo ne bo ipapisitse le lipuisano tsa boleng tse entsoeng le baetsi ba meralo ea litoropo le libaka tse robong hammoho le tlhahlobo ea meralo e sebetsang

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ea ntlafatso ea libaka (SDFs). Ho fumanehile hore li-SDF sebakeng sena ha li kenyeletse W&D hantle. Ka hona, ho khothaletsa hore baetsi ba melaoana hammoho le meralo ea litoropo le libaka ba lokise litokomane tsa maano ho thusa ntlafatso ea meaho ea W&D. Ho boetse ho khothaletsa hore litokomane tsa maano li eletsoe ke matsapa a W&D ho fapana le ho ipapisa le ts'ebeliso e pharaletseng mobu ea liindasteri.

1. INTRODUCTION

Logistics processes, which facilitate the flow of goods between points of origin and points of consumption (Li, 2014: 1; Verhetsel *et al.*, 2015) are pivotal in contemporary economies characterised by urbanisation, internationalisation, and globalisation. Largely responsible for the physical distribution component of logistics (Hesse & Rodrigue, 2004: 171), warehousing and distribution (W&D) facilities are particularly pertinent to urban and regional planning because they are the most space-extensive component of logistics and supply chain. There is a concern that the growing number of logistics facilities impact profoundly and negatively on urban areas. Major repercussions, which adversely affect the performance and economic competitiveness of cities, include air pollution, noise pollution, and traffic congestion (Taylor, Tseng & Yue, 2005: 1667). Despite the importance and challenges of logistics activities highlighted above, the regulation of the establishment of logistics facilities has been inadequate because of the poor relationship between logistics planning and urban policy (Heitz, Launay & Beziat, 2019: 17; Yuan, 2019: 15). There is similarly a dearth of literature on freight-related land-use policy and planning (Holguin-Veras *et al.*, 2021: 3). Planning practices are essential for the development of logistics facilities because they encompass fundamental location decision-making factors such as land-use policies, job-related policies, financial incentives, and environmental regulations. Institutional influences of logistics facilities' location-choice decisions are, however, rarely considered in the literature. This is notwithstanding the fact that decisions made by

institutions regarding land use are influential. Hence, it is crucial that the implications of these decisions are not ignored (Yuan, 2019).

To contribute in part towards filling the knowledge gap above (*i.e.*, on the institutional factors), the article aims to analyse the inclusion of W&D in the spatial plans applicable to the Cape functional region, South Africa.

2. LITERATURE REVIEW

2.1 Growth and ramifications of logistics facilities

W&D is regarded as an integral part of supply-chain management (Vasiliu, 2008; CSCMP, Keller & Keller, 2013: 1; Marchuk, Harmash & Ovdienko, 2020: 32). Because of the constant improvements to supply-chain processes, warehousing activities, in turn, experience significant transformations, including automation and the improved integration of digital/virtual and physical systems, known as Industry 4.0 (Ma, 2019: 27). The once passive warehousing activities directed at the simple function of product stockpiling now integrates multiple services for customers and handle a multitude of goods at a lower cost (Ma, 2019: 27). Coyle, Bardi and Langley (1996) emphasise that present-day warehousing functions are not necessarily centred around long-term storage. Instead, they provide a fast-paced environment with the aim of speedily and efficiently moving goods through the warehouse facility (Coyle *et al.*, 1996: 248; Mostafa, Hamdy & Alawady, 2019). Although warehouses still encompass the traditional functions of inventory holding and storage, they also act as cross-docking points, where products are moved through the facility without requiring storage; value-added service centres, in which activities such as labelling and pricing commence; production postponement points, where goods are configured or assembled in response to customer demands; returned goods centres, which deal with reverse logistics, and other activities such as service and repair services (Maltz & Dehoratius, 2004: 1-3).

The world is experiencing a rapid growth of logistics facilities, in general, and W&D, in particular. For instance, in the United States of America (USA), the warehousing industry has experienced a substantial boom since the 1990s (Dabanc, Ogilvie & Goodchild, 2014). In 2014, South California, which accommodates one of the biggest concentrations of logistics activity in the USA, had roughly 1.2 billion square feet (111.5 million square metres) of W&D space, of which approximately 90% was occupied. Notably, relative to demand, it is anticipated that, by 2040, South California will have a shortfall of over 527 million square feet (48.9 million square metres) of warehousing space (SCAG, 2016: 53, 55). Gutelius and Theodore (2019) add that, with the continued growth in demand, aggregate employment levels in the USA's warehousing industry will likely continue to increase. Demonstrating the growth of warehousing in a different context, Greenhalgh *et al.* (2021) discovered that the number of large distribution warehouses in England and Wales grew by approximately 22% between 2010 and 2020. In Africa, the demand for good warehouse space continues to surpass supply across numerous cities. The decline in land supply, coupled with the increasing demand, exerts pressure on land prices that result from competition for the best locations (Knight Frank, 2021: 2). Amid the weak economic climate, demand remains stable for prime warehouse space in South Africa (Knight Frank, 2021: 2).

Logistics activities, including storage and transportation, have been considered to be the most significant source of pollution across supply chains (Piecyk & McKinnon, 2010). The significant adverse environmental impacts of warehousing have, therefore, become a growing concern to many residents in cities (Carrano *et al.*, 2015; Meneghetti, Dal Borgo & Monti, 2015a, 2015b; Żuchowski, 2015; Dadhich *et al.*, 2015; Fahimnia, Sarkis & Eshragh, 2015; Fichtinger *et al.*, 2015; Ries, Grosse & Fichtinger, 2017).

2.2 Planners' perception of logistics facilities

The increasing number of logistics facilities exert tremendous pressure on public policy, which has to address issues pertaining to real estate, vehicular flow, environmental concerns, and parking considerations, among others (Coulombel *et al.*, 2018). These diverse issues show that the placement of logistics facilities is a complex process, which is influenced by various stakeholders, including urban and regional planners. Planners always faced the issue of analysing and addressing the evolution and development of the urban structure (Woudsma *et al.*, 2008: 277). The relationship between transport and land use represents one of the considerations (Woudsma *et al.*, 2008: 277) planners need to analyse, in order to understand the dynamics of cities and regions (Wilson, 2000). Holguin-Veras *et al.* (2021: 7) asserts that there is a need for better land-use practices, which consider the requirements and impacts of logistics activities, as they have the potential to positively influence the efficiency of supply chains.

McKinnon (1983: 396) notes that urban and regional planners have typically been inclined to view warehousing and logistics facilities, in general, as low-order economic activity, a view that informs the formulation of many policies. As mentioned earlier, land-use policies, *inter alia*, impact on location decision-making processes. The extent of land parcels, the availability of land, internal and external industrial linkages, and land-use development have played a significant role in influencing decisions on choice of location. Numerous municipalities have responded to this, by implementing land-use planning guidelines such as zoning regulations, which classify warehousing as part of industrial zones (Yuan, 2019: 9-10). McKinnon (1983: 396) argues that warehousing is a perplexing topic among planners. The topic seems to range from being disregarded to incurring opposition. Watts (1977) deems that the general

consensus among urban and regional planners is to classify warehousing as an undesirable activity, due to the limited employment opportunities it presents. Yet, it consumes large portions of land, increases vehicular traffic, and commonly displays a visually unpleasant exterior. The aforementioned industrial zoning classification restricts warehousing as an industrial land use and limits the permissions for development and operations. Zoning regulations have inadvertently made it challenging to distinguish warehousing from industrial land uses, a situation that consequently affects the extent of land made available for warehousing facilities. Relatedly, Yuan (2019) consulted an urban and regional planner who expressed a view that there were no explicit policies that focused on the development of warehouses.

Environmental impacts (mentioned in Section 2.1) exert tremendous pressure on urban and regional planners and local authorities (Yuan, 2019: 12-13). Local governments strive to achieve sustainable development and ensure high-quality environments but tend to overlook the impact of warehousing. Some cities have acted to mitigate the impacts, by investigating and implementing new policies such as special zones, where the development of warehousing is prohibited. As noted earlier in this section, many authorities consider warehousing to be a less desirable industrial land use, and neglect to update standards and restrictions that inform the development of warehousing facilities (Yuan, 2019: 13-14).

2.3 Theoretical frame of reference

The article draws on the institutional turn in human geography (Jessop, 2001; Martin, 2000; Wills, 2019: 421), which is based on the argument that the economic landscape cannot be sufficiently understood without considering the influence of institutions. Although institutions are not solely responsible for particular geographical distribution of economic activity (W&D in the context of this article), they can enable or

constrain development (Mokhele, 2018: 3). Prior to the advent of the institutional turn, classical location theory largely interpreted economic behaviour as rational and atomistic, while ignoring or assuming that social and political factors were fixed (Jin *et al.*, 2020: 3-4).

3. STUDY AREA

The article is based on the study area of the Cape functional region, in the Western Cape province, South Africa. The region comprises three municipalities: City of Cape Town metropolitan municipality, Drakenstein local municipality, and Stellenbosch local municipality (Figure 1). It should be acknowledged that the phrase 'Cape functional region' is ambiguous, and there is currently no agreement on the region's geographic scope. Mokhele (2016) notes that derivatives of the Cape functional region include Cape Town hinterland functional region (Donaldson, Ferreira & Spocter, 2012) and Cape Town city-region (OECD, 2008), based on different geographical areas.

Amid the differences reflected by the above examples, the article defines Cape functional in terms of the three municipalities of City of Cape Town, Stellenbosch, and Drakenstein. Specifically, the rationale for this delimitation was informed by particular characteristics that are important for logistics processes. These include the presence of major transportation routes in the area, especially the second-largest container port in South Africa (Port of Cape Town), Cape Town International Airport, national roads and a railway network that transcends the three municipalities. Because of these characteristics, as well as the functional and geographic adjacency of the three municipalities, the Cape functional region was considered an appropriate study area for analysing the inclusion of W&D in the spatial plans. While recognising that the calculation of logistics cost at a subnational level is not common, it is reported that the Western Cape province contributes roughly 17% to South Africa's

logistics cost (Havenga *et al.*, 2015: 3), which includes transport costs, warehousing (including storage and handling) costs, inventory carrying costs, as well as management and administration costs (Havenga *et al.*, 2016: 9). Logistics cost in South Africa is higher compared to the so-called developed countries (GAIN Group, 2020: 10). This implies that, if properly planned for, W&D has the potential to contribute towards the reduction of the overall logistics cost.

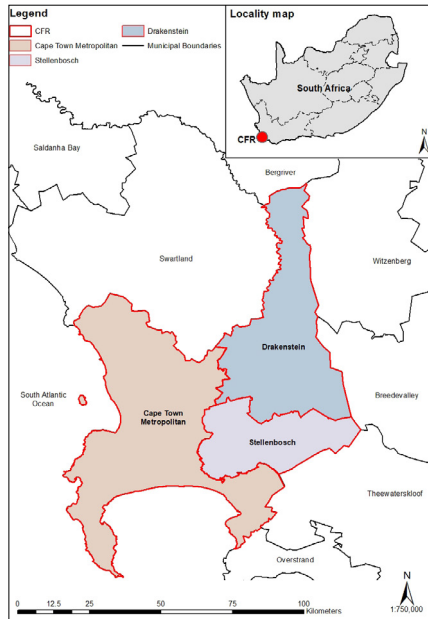


Figure 1: Study area
Source: Authors

4. RESEARCH DESIGN AND METHODS

4.1 Research design

The study employed a mixed-methods design, which combined qualitative and quantitative approaches towards improving the comprehensiveness and validity of research (Schoonenboom & Johnson, 2017: 108, 110). There are four main types of mixed-methods designs, namely triangulation, embedded, explanatory, and exploratory designs (Creswell & Clark, 2006: 59). As the study was predominantly qualitative, embedded design was adopted, wherein quantitative data was embedded within a qualitative methodology (Creswell & Clark, 2006: 67). In this regard, as presented hereunder, the

study hinged on content analysis of the spatial development frameworks (SDFs) and interviews conducted with urban and regional planners.

4.2 Sampling

Nine urban and regional planners, who were in the employ of, or had previously worked for the three municipalities in the Cape functional region, participated in the study. The snowball sampling method was used to identify the respondents. The process started with a limited number of respondents and expanded based on the connections provided by the respondents contacted earlier (Neuman, 2001). The rationale for using this method was that planners may have had access to knowledgeable people, who would have been difficult to know without referrals. The selection of urban and regional planners across the three municipal areas was also based on their rank and position occupied within a given municipality. In this regard, senior urban and regional planners and/or planners with managerial status were contacted. As reiterated later with the discussion of ethics, it should be noted that some of the planners who were identified for the qualitative interviews (particularly from the City of Cape Town and Stellenbosch municipalities) were not available to participate in the research process. Table 1 lists the nine planners who were willing and available to participate.

Table 1: Respondents for the qualitative interviews

Respondent	Title	Municipality
A	Former official	Drakenstein
B	Official	City of Cape Town
C	Official	Drakenstein
D	Official	Drakenstein
E	Official	Drakenstein
F	Official	Drakenstein
G	Official	Drakenstein
H	Official	Drakenstein
I	Official	Stellenbosch

Source: Authors

4.3 Data collection

The consent of the available nine urban and regional planners was an essential component of the interview

process. A consent form was thus formulated to outline the ethical parameters, including the degree of confidentiality and anonymity, and the manner in which the data would be stored. The purpose of the discussion was to inform the respondents of what the interview would encompass and whether they would consent to the interview. The respondents were accordingly required to sign the consent form and agree to the terms prior to the start of the interview.

Guided by the interview guide (see Table 2), the interviews were conducted in November and December 2021, either virtually on the online platform of Microsoft Teams or face-to-face, depending on the preference of each urban and regional planner/respondent. Participation was entirely voluntary and was emphasised in the emails sent to the identified planners for the arrangement of the interviews. In this regard, no potential respondent was coerced into or tricked to participate. Hence, it was decided to proceed with the nine planners, who were voluntarily willing and available to be part of the process.

Table 2: Interview guide

1.	In your view, what role do warehousing and distribution facilities play in the economic prospects of cities and regions?
2.	In your opinion, do planners and policymakers understand the role and importance of warehousing and distribution activities? [Probe if necessary – why do you hold that view?]
3.	Which policies and by-laws are important in guiding the location of warehousing and distribution facilities in your municipal area?
4.	Do these policies and by-laws (adequately) acknowledge the importance of warehousing and distribution facilities?
5.	Has policy changed/evolved to accommodate and promote warehousing and distribution facilities in your municipal area?
6.	Why do you think warehousing and distribution facilities typically locate in industrial areas?
7.	Do you believe it is ideal to promote warehousing and distribution facilities in industrial areas? If so/not, why?
8.	Do you think there will be a rapid growth of warehousing and distribution facilities in your municipal area within the next few years? If so/not, why?
9.	Do you think the current planning (system), policies and by-laws would be able accommodate a rapid growth of warehousing and distribution facilities?
10.	In your view, what could be done to improve the connection between spatial planning and planning for logistics facilities, in general, and warehousing and distribution facilities, specifically?

If a respondent granted consent for the interview to be recorded, the recording was transcribed afterwards using Adobe Premier Pro. The text file transcriptions had to be evaluated and cross-referenced to the recordings to accurately quote direct speech. For the most part, Adobe Premier Pro transcription was accurate, albeit some wording had to be amended to correlate with the recording.

4.4 Data analysis

Data obtained from the qualitative interviews was cross-referenced with content analysis of the SDFs, conducted in Atlas.ti. The content analysis focused on the following SDFs that were retrieved from the websites of the municipalities in the Cape functional region: City of Cape Town municipality (2018), Drakenstein municipality (2018) and Stellenbosch municipality (2019). Each SDF was independently imported into Atlas.ti and analysed to generate word clouds. The reoccurrence of the most prominent

words in each SDF was cross-referenced to the keywords associated with W&D, namely warehousing, logistics, distribution, packaging, courier, transportation, delivery, freight, trucking, as well as movers and removers. The presence of the keywords was then traced to where they were mentioned in the SDFs content to provide context on whether they were linked to W&D. The adoption of these keywords as representative of W&D is supported by the work of Burger (2003: 53-58); Walters (2003: 13-14), and Riopel, Langevin & Campbell (2005: 12-17), who analysed, *inter alia*, the components of logistics and supply chain.

The analysis above was largely informed by Prior (2011), who asserts that one of the approaches used to analyse policy statements involves counting the number of times certain words appear in a document.

5. FINDINGS

Qualitative interviews with urban and regional planners (respondents A, B, C, D, E, F, G, H, I) confirmed that spatial development frameworks (SDFs) are some of the planning documents that are expected to guide the establishment of W&D facilities in the respective municipal areas. Respondent 'I' asserted that the SDF is the primary document used to facilitate the location of economic activities/land uses, in general, including W&D facilities. The respondents mentioned other important policy documents and instruments, including the integrated development plan (IDP), zoning schemes, land-use planning by-laws, densification policy, urban design policy, integrated economic growth strategy, comprehensive integrated transport plan, arterial management plan, greater Cape metropolitan regional implementation framework, and the distribution cost policy. Qualitative interviews with all the respondents reflected that the general conception among urban and regional planners was that policy documents do not prioritise W&D, and that hardly anything is known on the intricacies of this land

use. Only respondent 'I' believed that there was a good connection between the Stellenbosch SDF and the location of W&D facilities in the municipality. Nonetheless, the respondents shared the view that the relationship between spatial planning and logistics activities such as W&D should be improved.

Observations drawn from analysing each municipal SDF suggested that planning for W&D had not been prioritised. Cross-referencing the City of Cape Town, Drakenstein, and Stellenbosch SDFs with the reoccurrence of the W&D-related keywords highlighted the lack of planning for W&D facilities. As discussed in Section 4.4, the keywords were warehousing, logistics, distribution, packaging, courier, transportation, delivery, freight, trucking, as well as movers and removers.

Table 3 illustrates the number of reoccurrences for each keyword across the three municipal SDFs in the Cape functional region.

land use. Another issue is that many city managers perceive that low-density warehousing correlates with fewer job opportunities (Yuan, 2019: 12). Respondent C suggested that policymakers and planners tend to overlook activities such as W&D because they are not significant job creators. The prioritisation of job creation sometimes clouds judgement on the future benefits activities such as W&D bring to the table, including the influx of supporting facilities catering to W&D facilities. Respondent B advocated that policy decision-making is not a straightforward process, as planning is inseparable from politics. It is suggested that policymakers tend to dictate policy decisions by focusing on agendas such as increased job creation.

All respondents regarded SDF as the overarching framework for guiding the location of W&D facilities. The analysis revealed that the SDFs for the City of Cape Town, Drakenstein and Stellenbosch municipalities did not recognise the complexities of W&D facility development. All three municipal SDFs showed that the provisioning of W&D facility criteria and development directives were limited. It is suggested that this is influenced by the lack of knowledge on the intricacies of warehousing and distribution. SDFs of the three municipalities tended to focus on development directives that cater to other land uses such as residential, agriculture, and transport infrastructure. The presence of keywords associated with W&D facilities, including warehousing, logistics, distribution, packaging, courier, transportation, delivery, freight, trucking, as well as movers and removers, were scarce in each municipal SDF. The City of Cape Town SDF predominantly exhibited the keywords development, land, areas, spatial, transport, economic, growth, infrastructure, policy, management, planning, residential, investment, and housing. The Drakenstein SDF predominantly exhibited the words development, spatial, land, areas, vision, housing, management, opportunities, infrastructure, economic, facilities,

agricultural, implementation, transport, and industrial. The Stellenbosch SDF predominantly exhibited the keywords development, land, spatial, areas, planning, housing, agricultural, infrastructure, transport, opportunity, management, economic, growth, facilities, and residential. Although it might seem that some of these words link to W&D facilities, when cross-referencing and navigating these reoccurring words to the actual text within each SDF, it was discovered that they were primarily linked to discussing themes that did not correspond with W&D. It is, therefore, concluded that the relationship between the SDFs and W&D is distorted. The respondents agreed that there was a need to improve the SDFs' cognisance and appreciation of W&D. The majority of the respondents suggested that there was a need for a new way of thinking when making policy decisions to improve planning for W&D facilities. Respondent A suggested that municipal areas could benefit from formulating a policy document stipulating the criteria for W&D facilities, while potentially still keeping it under the umbrella of industrial land use. Respondent B suggested that spatial planning and policy is lacking in refining the grid of numerous types of industrial uses such as W&D. Respondent C suggested that municipal SDFs should be broader in scope. At the same time, local spatial development frameworks (LSDFs) should target specific areas in more depth to facilitate the development of activities such as W&D. The evaluation of emerging land-use trends should be integrated and strengthened between the SDFs, zoning schemes and by-laws. Respondents E and H alluded to the advantages and disadvantages of W&D facilities and recommended that they be studied in-depth to improve the relationship between spatial planning and W&D.

7. CONCLUSION

The objective of the article was to analyse the inclusion of W&D in the Cape functional region's SDFs. Based on a combination of content analysis of the SDFs and

qualitative interviews conducted with nine urban and regional planners in the region, the study discovered that, although there are principal documents that guide spatial development, SDFs in the region did not sufficiently acknowledge or incorporate guidelines and/or strategies pertaining to W&D.

To improve the much-needed relationship between spatial planning and W&D, it is recommended that:

- Policymakers as well as urban and regional planners align policy documents to facilitate the location of W&D facilities. Although the prioritisation of other land-use categories such as residential, agriculture and transport infrastructure bring great value to each municipality, the advantages of W&D facilities have not been recognised extensively. With the growing locational trends of W&D facilities amid the growth of e-commerce, municipal areas might miss out on or not be prepared for the increasing concentration in the region.
- Policy documents be informed by the intricacies of W&D facilities instead of merely being based on broad industrial land use.
- Policymakers as well as urban and regional planners be capacitated on the importance of W&D and factors that influence the locational patterns of W&D facilities.

To go beyond the analysis of the inclusion of W&D in the spatial plans (in the manner of this article), it is suggested that future research empirically analyse the connection between spatial planning and the locational patterns of W&D facilities within the South African context.

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