

Article

Evidence to Inform Resilience Policy in the SADC: Current Limitations and Future Research Areas

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Abstract: The Southern African Development Community (SADC) and its member countries are potentially vulnerable to external disturbances, including environmental, economic, and social shocks. Regional policy emphasizes interventions to ensure long-term growth and development in the face of potential disturbance. Current emphasis is placed on mitigating the impact of climate change, including the creation of the SADC Climate Change Strategy and Action Plan. However, the need for long-term adaptation and associated policy is evident to reduce regional vulnerabilities. Research is an important source of evidence to support policymaking, with specific importance to institutions in developing regions such as the SADC and during times of global change and disruption. SADC development policy related to resilience outcomes ought to be informed by research. This paper investigates the extent to which existing research supports regional resilience policymaking. Objectives include investigating available research on resilience in the SADC, identifying potential limitations, and delineating areas of future research to be considered by researchers that contribute to knowledge and evidence creation. A bibliometric review and selective content review of existing research were utilized. Relevant publications for the aforesaid analysis were delineated using the source concepts “resilience”, “adaptation”, “adaptability”, and “Southern African Development Community” (or “SADC”). Using the SCOPUS database, bibliometric data of 65 publications were imported into the VOSviewer application (v.1.6.17). Keyword occurrences and network and overlay visualizations were applied to identify the research themes underlying current research. The findings, which were supported by the selective content review, indicate that existing research focuses primarily on environmental and social disturbances, while the applicable regional planning scale and development policy are considered to a limited extent. Areas of future research ought to create evidence that is thematically relevant to policy areas and applicable to policy interventions, which necessitates increased research on economic disturbances, a broadening of existing themes to the appropriate regional planning scale, and consideration of explicit regional development objectives and policy. Transdisciplinarity ought to be central to future research on the diverse disturbances facing the region, while researchers ought to leverage knowledge-creation opportunities catalyzed by SDG implementation.

Keywords: regional resilience; regional policy; SADC; bibliometric review; external disturbances



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1. Introduction

Developing countries, including the member countries of the SADC, face significant disruptions from external disturbances of an economic, social, and environmental nature. This includes, inter alia, vulnerability to economic shocks that influence output and production patterns [1], environmental degradation and climate change [2], and current and future public health emergencies [3]. These challenges have the significant potential to affect long-term socio-economic development objectives of the regional bloc and its members, which

include the aim of fostering economic growth and poverty alleviation, enhanced quality of life for the regional population, as well as security and peace [4]. In response, policymakers in SADC supranational institutions have sought to develop policies to alleviate the risks faced by the region, including the development of the SADC Climate Change Strategy and Action Plan, which focuses on specific interventions to catalyze adaptation to climate change and its effects on the region [5]. However, the need for sustained adaptation and adaptability to diverse socio-economic and environmental challenges, to which the member countries of SADC remain vulnerable, is apparent [6]. The need exists for the development of holistic policies that underline the resilience of the SADC through alleviating its vulnerability to external disturbances, mitigating the potential impact of said disturbances on regional systems, and enabling the region to delineate a new way forward to sustain long-term growth and development.

A central factor of importance in the delineation of regional resilience policy is capacitated policymakers and supranational institutions that delineate informed, place-based interventions [7]. The policy ought to be informed by research to guide the nature and spatial focus of interventions and ensure relevant and desirable outcomes. The relationship between research and policy has grown in prominence, with the former playing an important role in providing evidence in the formulation and implementation of the latter [8]. Robinson et al. [9] (p. 1) state that this “evidence revolution”—the notion that research ought to contribute to evidence-based policy—has proliferated across diverse policy and spatial contexts. The interface between research and policy is of particular importance in countries of the Global South and regions such as the SADC, where context-specific research is required to support policy-making capacity and management of diverse development functions [10]. In times of global processes of changes and disturbance, the role of research in informing policymakers is especially pronounced, as said changes “increasingly call for concrete evidence to support or challenge the innovations that are implemented in a variety of contexts” [11]. In the framework of this utility of research, SADC development policy, including those related to supporting resilience, thus ought to be informed by research. Accordingly, the aim of this paper is to investigate the extent to which existing research may support resilience policymaking in the SADC through (i) investigating the currently available research on resilience in the SADC, (ii) identifying potential limitations in current research in this context, and (iii) delineating prominent areas of future research to support resilience policy in the region.

The method utilized to achieve this research aim is a bibliometric review and selective content review of existing resilience research specific to the SADC region. As further referenced in this paper, there is ample research on resilience themes in the context of the SADC. However, limited research is available that applies the mentioned methodology toward investigating existing research to subsequently inform policymaking in the region within a specific policy area. This paper contributes to the application of said methodology within this context, in addition to supporting a research-based approach to policy formulation and its role in promoting the socio-economic development objectives central to the SADC. The following sections include a literature review on the central themes of this paper, including external disturbances, resilience, SADC regional policy and institutions, and the role of research in policymaking. This is followed by an extended discussion on the methodology applied in the analysis, the delineation of the findings of the bibliometric review and related discussions, and the conclusion of the paper.

2. Literature Review

This section provides an overview of the literature relevant to external disturbances and vulnerability, regional resilience, and the role of institutions in SADC resilience policy.

2.1. Vulnerability to External Disturbances

Regions and countries in the Global South are vulnerable to multiple economic, social, and environmental disturbances originating in external regions that might affect internal

growth and development objectives [12,13]. In the economic context, external economic shocks have significant potential to disrupt internal production systems in developing countries [14]. The Global Financial Crisis of 2008 is an example of such a disturbance, where downturns in the financial and housing markets in the United States of America and other developed countries led to a downturn in export demand for developing countries [15,16] and decreased foreign direct investment (FDI) in markets such as the SADC as firms, consumers, and investors turned risk averse. The SADC experienced a significant decrease in trade and investment with major trading partners during this period [17]. Developing regions remain vulnerable to future economic shocks that might similarly affect socio-economic growth and development. This is underlined by limited export diversification and industrialization, which is also relevant to the member countries of the SADC. Existing research points to economic openness (in terms of exports as percentage of total trade and the scale of import tariffs), export market dynamics (income level of markets), sectoral composition (contribution of primary, secondary, and tertiary sectors to economic output) [1], and degree of regional integration (trade between member countries) [6] as factors that affect regional economic resilience through either lowering the impact of the initial shock on the regional economy or hastening the recovery of the previous growth trajectory. Pretorius et al. [1] note that interventions toward reducing economic vulnerability (e.g., restrictions on import and export markets) ought to be balanced with their potentially adverse effect on economic growth.

In addition to external economic shocks, social disturbances may also place pressure on the resilience of regions and their member countries. One such disturbance is the Coronavirus (COVID-19) pandemic, which has highlighted the threat of public health emergencies on growth and development objectives in developing countries [18], where significant pressure has been experienced in public health systems, social networks, physical and mental wellbeing. In the SADC, the aftermath of COVID-19 has also highlighted the ineffectiveness of social and emergency interventions to mitigate the impact of the pandemic on vulnerable populations [19]. The tourism industry, which contributes to significant employment opportunities for local populations, suffered severely [20]. Related disturbances have constituted a significant shock to member countries of the SADC [21]. Other social phenomena, such as sustained population growth [22] and urbanization [23], and the strain on resources these represent, also constitute challenges for policymakers in the SADC and its member countries. Policy responses ought to consider the environmental impact of human activities and development while also facilitating socio-economic growth in line with development objectives [24].

An additional consideration is global warming and the degradation of the natural environment, which emphasizes the need for resilience policies to foster mitigation and long-term adaptability in the SADC and other developing countries and regions [25]. Climate change is set to be a significant catalyst of worldwide environmental, social, and economic change [26]—particularly in developing countries where agricultural production is vulnerable to environmental alterations, which presents a looming disturbance to a sector that contributes a significant share to economic production and employment [27]. Specific to the SADC, the impact of climate change is “expected to be compounded due to the region’s high poverty levels, weak infrastructure, poor management of natural resources and dependence on rain-fed infrastructure” [28] (p. 133). Already drought-prone member countries will experience higher temperatures, impacting regional food security and related economic and social outcomes. The latter is also related to the vulnerability of regional healthcare systems in the face of changing burdens of disease attributable to the changing climate [29].

The abovementioned economic, social, and economic disturbances and their potential to inflict significant disturbances to the SADC and its member countries constitute the motive for the development of the resilience of the region and its member countries.

2.2. Overview of Regional Resilience

Resilience research is much diffused and has been undertaken in diverse fields and disciplines, and therefore, various definitions and applications can be identified in the literature [30,31]. Avenues of resilience research include, *inter alia*, urban and regional planning [32], ecological systems [33], psychological and social systems [34], and economic studies [35]. The most prominent cluster, and the one which constitutes the foundation of research in other fields, is the resilience of ecological systems to exogenous threats [36]. Within this paradigm, resilience is the ability of natural systems to adapt and foster ongoing adaptability to the current and potential future effects of disturbances originating external to the region [26]. While said disturbances may affect its function, a resilient system is one that changes and adapts while being able to provide the same or better outcomes as in the period prior to the disturbance [30,37]. Within the context of this paper, which is anchored in regional policy on the supranational scale of the SADC, resilience can be seen as the region sustaining long-term socio-economic growth and development in the face of external disturbances which may otherwise affect the development trajectory [38]. Resilience in this developmental paradigm is measured by the capability of the relevant regional systems to, firstly, withstand the initial effects of the external disturbance on their functional capacity, and secondly, to rapidly recuperate any lost output in the post-shock period [39–41]. Evidently, the themes of ‘resistance’ and ‘recovery’ are central in conceptualizing regional resilience [42].

The analysis of resilience within the regional context may be done retrospectively by investigating the impact of previous disturbances. Examples of retrospective analyses are that of Brixiová *et al.* [43], who use a previous economic shock in determining the potential mitigating effect of intra-regional trade on a future economic shock, and Pretorius *et al.* [44], who analyze the role of supply chain efficiency in mitigating the trade impact of COVID-19, with the objective of delineating policy interventions to create resilient supply chains and reduce the impact of future disturbances. The contribution of these analyses of resilience, while based on different disturbances, is the delineation of factors that may support resilience in their context, which may be extended to other contexts by future research. Policy measures can then be identified to be implemented in regions considered vulnerable to specific disturbances.

In analyzing the extent of regional resilience, three approaches can be delineated. This includes the equilibrium and multiple equilibria approaches, as well as the systems and long-term perspective. The equilibrium approach assumes that the region maintains a steady growth path from which it deviates in the event of an external disturbance [38]. Regional resilience, in this regard, is measured by the extent of the deviation from the pre-shock equilibrium state and the period needed to regain this trajectory after the shock [45,46]. This deviation is measured using one criterion, which may include indicators of living standards, quality of life, human development, employment, and economic output [47]. In comparison, the multiple equilibria approach differs through rejecting the assumption that regions have a predetermined growth path which is naturally resumed in the post-shock period. Rather, actions by agents and decision makers—i.e., interventions by policymakers—create different trajectories that regions may follow after the effects of the disturbance [48].

The systems perspective of resilience [30] builds on the multiple equilibria approach in maintaining that resilience is a product of the complex interaction between diverse factors within a system—or region—including pervasive social conditions, political environment, economic agents, institutional role players, and environmental considerations [49,50]. Dubbed the social structures of accumulation [51], these networks of interaction catalyze structural change to the system over time to maintain favorable conditions for growth and development over the long term. According to this perspective, a resilient region is one that can maintain a stable social structure while having the ability to negotiate and transition to a new structure to support ongoing growth and development [30,38]. The notions of adaptation and adaptability are central to a resilient region’s ability to foster internal change

and follow a new growth path [37,52–54]. For this study, adaptation is considered to be the action of continuous change to support long-term growth and development [6], while adaptability is considered to be the ability to catalyze change in response to potential disturbances [55,56].

2.3. Role of Institutions in SADC Resilience Policy

The actions of policymakers are central to fostering the characteristics of adaptation and adaptability, as institutions, economic and political agents, and social networks should “create and sustain the capacity to learn and adapt” [30] (p. 12). Regional resilience requires pro-active policy formulation and decision-making by political agents and economic role players, with the planning process coordinated by well-capacitated institutions [56]. Institutions should have sufficient human capacity [57] to delineate appropriate growth and development path to support regional resilience and to plan and implement appropriate interventions to achieve the desired development trajectory. In the context of the SADC, supranational institutions need to apply conducive policies to facilitate the process of fostering resilience in the region, its member countries, and urban environments.

A prominent supranational institution in the region is the SADC Secretariat, which coordinates the development and implementation of regional development policies and programs [58]. One such planning instrument is the Regional Indicative Strategic Development Plan (RISDP), which identifies investment and development priorities in the region [59]. Regional integration, through economic liberalization and trade facilitation, is central to the objectives of the SADC, with supporting policies such as the SADC Industrialization Strategy and Roadmap seeking to catalyze related economic and productivity objectives [60]. Regional development policies emphasize regional economic outcomes, with limited consideration of resilience-specific interventions. The policies that do exist, such as the SADC Climate Change Strategy and Action Plan, focus on environmental outcomes, including climate change adaptation and disaster risk management [5].

2.4. The Role of Research in Policymaking

In general, there are various role players that contribute to the policymaking process, including the policymakers that consider the available evidence in the formulation process (SADC institutions); the recipients of policy (e.g., public, private sector and communities in member countries); and non-sector stakeholders that are intermediaries between the policymakers and recipients of policy (e.g., pressure and lobbying groups) [61]. The producers of the relevant evidence in the policymaking process are researchers. Research is an activity that seeks to contribute to knowledge creation through generating new ideas or providing evidence for existing ones [62]. The benefits associated with the outcomes of research ought not be limited to the researcher but are also expected to have potential utility for the policymaker, among other role players [63]. The importance of research as the basis for policymaking is supported by Muluk and Winoto [63] (p. 287), who state that the former is “necessary for determining and reading the direction of policy and the consequences of future risks”. Trostle et al. [64], through synthesizing the models of Weiss [65], delineate three approaches by policymakers in utilizing research in the policymaking process, namely the rational, strategic, and diffusion approach. The rational approach states that policymakers will use research that is available and will commission additional investigations should additional evidence be required. The strategic approach includes the use of research to support existing policy positions or other strategic objectives. The diffusion approach states that policymaking is influenced by diverse forces, of which research is one—all of which may contribute to identifying additional problems and presenting potential solutions to policymakers. While research may be utilized in different ways in the policymaking process, these approaches further underline the importance of research in informing policymakers.

Despite the potential role of research, there are barriers that may limit its application in policymaking. One such barrier is the inherent difference between research activities, or knowledge production, and that of policymaking, where objectives and methods are not

automatically aligned, with results from the former difficult to transfer to the latter [11]. Additional barriers include that research is not always “context sensitive, timely and relevant for policy-makers”; limited interest on the part of policymakers in utilizing research evidence; challenges in policymakers accessing relevant research; and their inaccurate interpretation of said research [66]. Muluk and Winoto [63] provide guidance on optimizing the contribution of research to policymaking. One requirement is that research ought to be relevant to policy, which may include relevance to the specific themes associated with the policy area. Secondly, research ought to provide tangible applications to policymaking, ensuring that the evidence presented by research may be implemented through policy.

3. Methodology

This paper applies both a bibliometric and content review approach in investigating current resilience research in the SADC toward achieving the aim of the paper. The relevance of utilizing the bibliometric review approach in this paper is due to its ability to illuminate the trends in current research based on certain indicators, including keywords, publications, and sources [67]. Bibliometric reviews from part of the approaches of Centobelli et al. [68] and Shashi et al. [69] as an instrument used to describe the character and provide a summary overview of existing research, which is then further analyzed to identify relevant areas of future research. In addition to providing an objective perspective of the applicable research [70], other advantages include that this approach is quantifiable and thus replicable [71], it has the ability to analyze large datasets published literature [72], and it enables the analysis of existing research within the context of specific objectives [73]. Gil et al. [74] (p. 2) further support the use of a bibliometric analysis as “an increasingly popular method for gaining insight into a field of scientific activity” that “allows for determining various aspects of scientific production”.

The first requirement in this approach is to delineate the relevant source concepts that will enable the identification of research to be included in the review [75]. The first source concept is “resilience”, due to the specific scope of this paper. Also included here are “adaptation” and “adaptability” due to their inherent relevance to the concept of resilience within the developmental paradigm, as discussed in Section 2. To reflect the spatial context of the paper, the final source concept is “Southern African Development Community” (and “SADC”). Secondly, these source concepts are used as input in the search function of the SCOPUS database to identify relevant data in the form of publications for further analysis. The utilization of the SCOPUS database in this regard is supported by Comerio and Strozzi [76] and Araújo-Vila et al. [77] (p. 15), with the latter selecting this database in part due to its “high-quality of abstracts of peer-reviewed literature on the web”. The output of the search on the database, i.e., the available research in the form of publications, is downloaded in comma-separated values (.csv) format.

Thirdly, these data are imported into the VOSviewer application (v.1.6.17) for further analysis. This software is broadly applied in studies undertaking bibliometric reviews [78–80] and has the ability to indicate the themes on which current research is based, as well as the publication trends and how the focus of research has changed over time. A particular advantage in utilizing the VOSviewer application is its functions relating to the “graphical representation of bibliometric maps” [81] (p. 536), which display the relationship between themes to allow for detailed investigation of the research. The research themes represented by the software are in the form of the keywords that form part of the title, abstract, and author keywords of each publication that is imported into the VOSviewer application through the .csv file.

The primary quantitative indicator that separates the keywords is occurrences. This represents the number of publications in which each keyword is found [82]. This allows for the analysis of the differences between keywords in the delineated research, which may form the investigative basis of the bibliometric review [75]. The relationship between keywords is represented by links. Linkages between keywords indicate that they occur together in at least one publication [82]. Network and overlay visualizations are two

graphical representations generated by the VOSviewer software. The former illustrates the relationship between keywords in the research, with reference to their occurrence and linkages, while also categorizing keywords into clusters. Keywords in the same cluster have stronger linkages (i.e., cumulatively occur together in more publications) with one another than with keywords in other clusters [82]. The overlay visualization provides a graphical illustration of the average publication date of each keyword in the research, which may provide insight into the research trends over time.

In addition to this, Islam et al. [83] also supports a content review approach of publications in the delineated research, which includes an investigation of the content of select publications, in addition to the keywords in the title, abstract, and author keywords used in the bibliometric review. Accordingly, this paper also incorporates an additional component in the methodology in the form of a selective content review. This is integrated into the discussion (Section 5) to further elaborate and “investigate the prevalent themes” [84] (p. 355) gathered from the bibliometric review, and their contextualization within the research limitations and areas of future research to support resilience policymaking in the SADC. Publications that are relevant to the findings identified through the bibliometric review will be selected for further review and identified by the keywords in their titles, abstracts, and those delineated by the author.

The content review approach, which is guided by the findings of the bibliometric review, represents an alternative to the *systematic* approach also applied in similar research. Inherent to the latter method is an additional “assessment of the sources along with a logical concept of the study” [74] (p. 4). This is guided by predetermined criteria, including publications’ methodology, findings, and impact [68], the type of study, the “problem addressed”, and the “proposed solution” [70] (p. 110), and a quantitative evaluation (including ranking) of publications based on the themes they address [69]. The bibliometric and content review approach is applied in this paper due to their relevance to the research objectives in providing a *thematic* overview of available research, identifiable limitations, and future areas of research (as partly applied by Islam et al. [83]), in comparison to the more “analytical” [69] (p. 794) approach central to the systematic review.

4. Results

The following section represents the findings of the bibliometric review. The subsections include an overview of the delineated research and the findings gathered from the three VOSviewer outputs, namely keyword occurrences, network visualization, and overlay visualization.

4.1. Overview of Delineated Research

From the input of the source concepts in the search function of the SCOPUS database, a total of 65 publications were identified. These included journal papers (45 in total; 69.2% of publications), reviews (8; 12.3%), book chapters (6; 9.2%), conference papers (3; 4.6%), a book, conference review, and short survey (1.5%, respectively).

As illustrated in Figure 1, there has been a marked increase in the number of publications in recent years, with 89.2% of related research published since 2007. This is further indicated in the upward trajectory of the publication trendline. In addition to the publications in Figure 1, there were also one publication in each of 1968, 1982, and 1997.

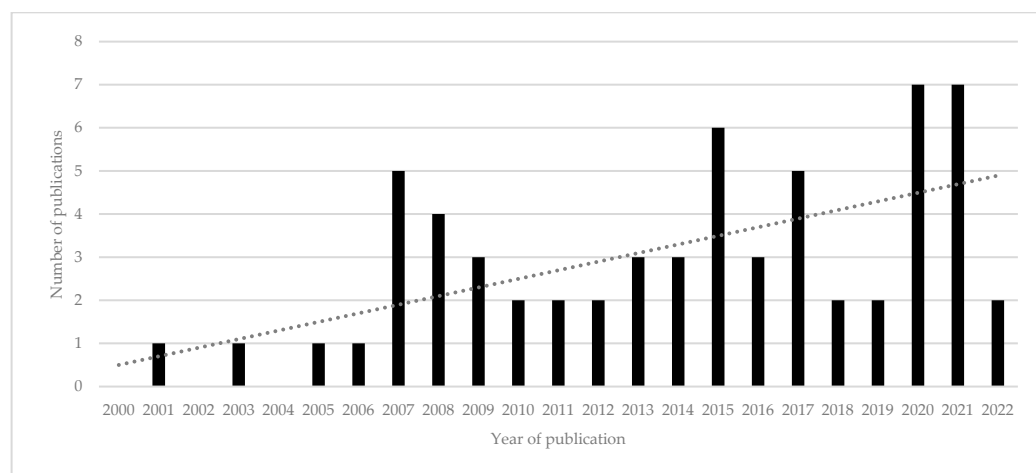


Figure 1. Number of publications per year (2000–2022).

4.1.1. Authors, 2022

The most prominent subject areas (as defined by SCOPUS) of these publications in terms of total publications per subject area are social sciences (31 in total; 47.7% of publications), environmental science (29; 44.6%), earth and planetary sciences (18; 27.7%), and agricultural and biological sciences (11; 16.9%). Others include, inter alia, medicine (8; 12.3%), energy (5; 7.7%), business, management and accounting (3; 4.6%), and economics, econometrics, and finance (3; 4.6%). There are eight journals that have published two or more publications in the delineated research. These include:

- Physics and Chemistry of the Earth (3 publications)
- Sustainability (Switzerland) (3)
- International Journal of Disaster Risk Reduction (2)
- Jamba Journal of Disaster Risk Studies (2)
- Journal of Arid Environments (2)
- Plos One (2)
- Water SA (2)
- Weather Climate and Society (2)

Table 1 illustrates the ten most cited publications among the research.

4.1.2. SCOPUS, 2022

Based on Table 1, the highest impact publications (based on citations) in SADC resilience research relate to the burden of disease (e.g., malaria and HIV), climate change, water and food security, drought, and disaster risk management. In total, the publications have been cited 2408 times.

Table 1. Most cited publications.

Title	Reference	Citations
The neglected burden of Plasmodium vivax malaria	Mendis et al. [85]	786
Africa—Climate Change 2014: Impacts, Adaptation and Vulnerability: Part B: Regional Aspects: Working Group II Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change	Niang et al. [86]	575
Equity and justice in climate change adaptation amongst natural-resource-dependent societies	Thomas and Twyman [87]	360
Building adaptive capacity to cope with increasing vulnerability due to climatic change in Africa—A new approach	Twomlow et al. [88]	77

Table 1. *Cont.*

Title	Reference	Citations
The water-energy-food nexus: Climate risks and opportunities in Southern Africa	Nhamo et al. [89]	64
Conceptualizing Community Mobilization for HIV Prevention: Implications for HIV Prevention Programming in the African Context	Lippman et al. [90]	45
The Spread of a Transnational Model: 'Gated Communities' in Three Southern African Cities (Cape Town, Maputo and Windhoek)	Morange et al. [91]	37
"A persistent truth"—reflections on drought risk management in Southern Africa	Vogel et al. [92]	29
The interesting cross-paths of HIV/AIDS and water in Southern Africa with special reference to South Africa	Obi et al. [93]	28
Open source GIS for HIV/AIDS management	Vanmeulebrouk et al. [94]	27

4.2. VOSviewer Output: Keyword Occurrences

The SCOPUS data (in csv. format) were imported into the VOSviewer application for further analysis, as discussed in Section 3. The first output generated was keyword occurrences. In total, 709 keywords were identified in the research by the software. A threshold of minimum number of occurrences per keyword was set to two. A similar threshold approach is applied by Islam et al. [83] to delineate the keywords that have been the primary focus of the delineated research. Once this threshold is applied to the keywords used in this analysis, 111 remain. To provide an overview of identified keywords, Table 2 indicates and ranks the keywords with at least three occurrences (i.e., the number of publications in which they appear).

Table 2. Keywords and occurrences in SADC resilience research.

Keyword	Occurrences
SADC (and variations)	19
Southern Africa	16
Africa	15
Human/Humans	12
South Africa	11
Climate change	13
Article	8
Adaptation	8
Female/Male	7
Sustainable development	6
Sub-Saharan Africa	6
Water management	5
Economics	5
Resilience	5
Disaster risk reduction	5
Climate change adaptation	5
Rural area	4

Table 2. *Cont.*

Keyword	Occurrences
Food security	4
Vulnerability	4
Economic and social effects	3
Water supply	3
Sustainability	3
Epidemiology	3
Water	3
Disasters	3
Health program	3
Major clinical study	3
Water resource	3
Food supply	3
Namibia	3
IWRM	3
Rainfall	3
Livestock farming	3
African American	3
Mozambique	3
Capacity building	3

Authors, 2022

From the keywords indicated in Table 2 and those remaining that occur twice, distinct themes may be identified that characterize the research. Firstly, there are keywords that delineate the context in which research takes place, namely the SADC (which is also a source concept), and individual member countries such as “South Africa”, “Namibia”, “Mozambique”, “Zimbabwe”, “Malawi”, “Botswana”, and “Lesotho”, as well as regional indicators such as “developing countries” and “Sub-Saharan Africa”. Secondly, these are keywords related to environmental themes, namely “climate change adaptation”, “disaster risk reduction”, “food security”, “water supply”, “rainfall”, “watersheds”, and “river basin organization”, among others. Select keywords that relate to social themes include “epidemiology”, “health program”, “HIV infections”, “health services”, “community care”, “demography”, “urbanization”, and “leadership”. Keywords in the economic context include “income”, “economic growth”, “economic analysis”, “regional integration”, and “trade”.

There are keywords relating to the regional development planning scope of the study, and of policymaking in the SADC, including “regionalism”, “regionalisation”, “regional planning”, and “regional development policy”. The keywords “sustainable development” and “sustainability” indicate the presence of sustainability themes in the research, while governance themes are applicable with keywords such as “capacity building”, “integrated approach”, “resource allocation”, “government”, and “governance approach”. The source concepts of “resilience” and “adaptation” are counted among the keywords, including related concepts such as “vulnerability” and “adaptive management”.

4.3. VOSviewer Output: Network Visualization

The second output generated by the VOSviewer application is the network visualization. As discussed in Section 3, this output illustrates the relationship between different keywords in terms of their linkages. When keywords are linked, this means that they appear together in at least one publication. Based on differences in linkages between the 111 keywords applicable to the analysis, different research clusters are demarcated.

Furthermore, keywords that reference the regional scale of research—which is applicable to the scope of this paper—including “regionalisation” and “regionalism”, are mostly limited to cluster three and linked to the environmental keyword of Integrated Water Resource Management (“IWRM”), with limited linkages with keywords in other clusters. The keyword “regional development policy”, which is situated in cluster three, has limited linkages with other keywords in that and other clusters. Keywords that may be associated with potential interventions in contexts associated with resilience, including “capacity building”, “resource management”, “strategic approach”, and “adaptive management”, are diffused across all clusters. The keyword “resilience”, which is also one of the source concepts, is linked with keywords with an underlying environmental, social, and economic theme while being situated in cluster three. Another source concept, “adaptation”, is situated within cluster three and is also linked with keywords that represent diverse themes.

While clusters may be characterized by an underlying theme, thematically diverse keywords are situated in each. As apparent in Figure 2, there are also significant linkages between keywords across clusters and themes, in addition to the intra-cluster relationships that underline their demarcation into clusters. This may be indicative of the transdisciplinarity that forms the basis of the research related to resilience in the SADC, with diverse research themes coalescing to create the current body of knowledge. Examples of the potentially transdisciplinary character of the research include the linkages between “economic and social effects”, “disaster risk reduction”, “food supply”, and “rural area”, as well as the linkages between “biodiversity”, “water resources”, and “land management”.

4.4. VOSviewer Output: Overlay Visualization

As discussed in Section 3, an overlay visualization is an output of the VOSviewer application that is applied to identify the manner in which research has changed over time by visualizing the average year of publication for each keyword. This allows for the identification of past and emerging keywords and research themes. The overlay visualization is illustrated in Figure 3. The output is similar to that of the network visualization, with the latter identifying the research clusters and the former the publication date. The linkages remain the same.

Authors, 2022

From Figure 3, it is apparent that the emphasis of research on the relevant social, environmental, and economic themes inherent to resilience in the SADC has changed over time. In the social theme, keywords such as “urbanization” (average publication year: 2001), “health services” (2007), “human immunodeficiency virus” (2007), “social capital” (2008), and “community networks” (2010), have given way to keywords the likes of “needs assessment” (2015), “health program” (2016), “palliative care” (2018). In the environmental theme, previous focus on “rivers” (2012), “watersheds” (2013), and “river basin(s)” (2013), have changed to “disaster risk reduction” (2018), “climate change adaptation” (2018), “climate effect” (2020), and “carbon” (2021), among others. Research on the economic theme, and the keywords that underline its presence, has been published more recently than that of the other themes. Keywords such as “regionalism” and “regionalization” appeared in 2017, while “economic analysis” (2019), “regional development policy” (2020), “regional integration” (2022), and “trade” (2022) have replaced previous keyword such as “pastoralism” (2012) and “livestock farming” (2015). Based on the overlay visualization in Figure 3, the underlying trend in research on resilience in the SADC is an emerging prominence in economic and environmental themes. The latter is anchored in keywords relating to climate change and disaster risk management.

themes contains fewer keywords and have fewer intra- and inter-cluster linkages. Some publications that are centered on economic disturbances are from Pretorius et al. [1] and Pretorius et al. [6], which investigate the impact of an external economic shock, in the form of the Global Financial Crisis, on regional economic growth and factors that may influence resilience.

As a potential outcome of the current focus of the research, keywords that relate to the possible delineation of interventions, including “capacity building”, “integrated approach”, “resource allocation”, “government”, and “governance approach”, are mostly related to environmental and social keywords and the themes they represent. Hagelsteen et al. [103] investigate the role of technical, processual, and contextual capacity in fostering sustainable development in the context of disaster risk reduction and climate change adaptation. Becker and Van Niekerk [104] have a similar focus on institutional capacity development toward adaptation and risk reduction, while Nemakonde et al. [105] and Kamara et al. [106] focus on institutional arrangements and government policies, respectively, to the same end.

Direct references to the application of research to specific regional development policy in the SADC is also mostly restricted to environmental themes, with reference to climate change adaptation. Select content examples include Kupika and Nhamo [107] who state that SADC policy has not sufficiently incorporated measures regarding biodiversity and wildlife protection in the face of associated disturbances, while Barnard [98] (p. 31) mentions that “much still need to be done in terms of SADC climate law and policy” and that mitigating measures in the energy sector can support the needed adaptation. Here, the SADC Climate Change Action Plan is referenced as an applicable policy. Van Garderen [108], also in the context of climate change, mentions the need for policy, including on the regional level, to support adaptation in the agriculture sector. Further capacity development toward effective climate change adaptation policy formulation, implementation, and enforcement is recommended by Ogallo [109]. A publication that does broaden the scope of policy recommendations toward the economic sphere is Pretorius et al. [1], who delineate how regional development policy, with reference to the RISDP, ought to incorporate interventions in support of economic resilience. While the bibliometric review groups the keyword “regional development policy” within the cluster with underlying economic themes, it is apparent that this keyword has limited linkages with keywords in its own and external clusters.

The predominant focus of current publications on environmental and social disturbances, and the restricted evidence available on potential economic shocks and disturbances facing the SADC and its member countries, constitutes a limitation of current research on resilience in the region. An additional limitation is the restricted specific reference to SADC regional development policies in current research. The references that are made to policy are mainly related to environmental themes such as climate change and disaster risk. The latter may be a consequence of the current narrow thematic focus of available evidence on disturbances that may be transferred to regional development policy. The overlay visualization, and the emerging keywords it identifies, indicates that environmental themes continue to be prominent in publications, with specific reference to “disaster risk reduction”, “climate change adaptation”, “climate effect”, and “carbon”. It is, however, evident that there are keywords with economic themes that are emerging in the research, including “economic analysis”, “regional integration”, and “trade”. This, together with the overall upward trajectory in the number of publications related to resilience in the SADC, may be indicative of expected growth in the evidence available on this theme to support policymaking in the region.

One possible catalyst of the emerging research themes identified in the overlay visualization is the influence of the promulgation of the Sustainable Development Goals (SDGs) on research and publication trends. The average publication year of research with the keywords “sustainability” and “sustainable development”, which have a direct thematic connection with the SDGs, is 2015—the year SDGs were adopted by United Nations member countries [110]. The linkages between these keywords and others such as “food security”, Integrated Water Resource Management (“IWRM”), and “environmental degra-

dation” may be indicative of the synergy between emerging environmental keywords in resilience research in the SADC and the targets of multiple SDGs, including SDG2 (zero hunger), SDG6 (clean water and sanitation), and SDG15 (life on land). This is also evident for emerging keywords relevant to the targets of SDG11, which seeks to “make cities and human settlements inclusive, safe, resilient and sustainable” [111]. These include “climate change adaptation” and “disaster risk reduction”, among others. Emergent economic keywords are associated with SDG8 (decent work and economic growth) and SDG17 (global partnerships). The connection between the SDGs and several emerging keywords in SADC resilience research is a possible indication that the drive toward SDG implementation and related research has in recent years catalyzed the exploration of new and relevant avenues that contribute to knowledge creation in the context of resilience in the SADC. This may further contribute to increased evidence to inform resilience policymaking in the SADC.

Additional emergent keywords in resilience research, as apparent in the overlay visualization, are “regionalization” and “regionalism”, which refer to the regional planning scale and scope of the paper. Currently, research that incorporates these keywords is mostly relevant to the context of water management. For example, Movik et al. [112] investigate the regional dynamics, networks, and actors relevant to Integrated Water Resource Management in the SADC. The restricted incorporation of “regionalism” and “regionalization” and the regional planning scale they represent constitute a limitation of current research. The importance of incorporating this planning scale in resilience research is emphasized by Barnard [98] (p. 31), who states that, in the context of disturbances perpetuated by climate change, “the transboundary nature of climate change and its effects necessitates regulatory action in the form of harmonized law and policy responses among SADC member states”. Accordingly, due to the nature of potential disturbances, their effects may be felt across locales and planning scales, ranging from cities and countries to the regional and global sphere. In the context of resilience in the SADC, this necessitates close cooperation with member countries and potential policy formulation and implementation on the regional scale. This is supported by Nhamo et al. [89] (p. 15), who write in the context of climate risks and opportunities that “the regional conceptual framework . . . present opportunities for developing comprehensive analysis approaches [. . .]. Challenges in southern Africa are generally similar in nature among Member States and an integrated approach to resource management at a regional level may bring the desired outcomes”.

An additional finding of the bibliometric review in the network visualization is that there are significant linkages between keywords across clusters and themes and that this may be indicative of transdisciplinarity in the research. This finding is further supported by the SCOPUS defined subject areas to which the research is relevant, with publications that form part of social sciences, environmental, earth and planetary sciences, agricultural and biological sciences, medicine, energy, business, management and accounting, and economics, econometrics and finance, among others. Transdisciplinary research involves the collaboration of numerous stakeholders, in fields that may not directly overlap, to create new theory and knowledge based on a common research question and aim [97]. Its possible presence in the research is represented by, inter alia, linkages between keywords such as “biodiversity”, “water resources”, and “land management”. Furthermore, Ndebele-Murisa et al. [97] find that transdisciplinary and multi-stakeholder research and collaboration is central in transferring knowledge among urban policymakers to support climate resilience. Engagement among diverse stakeholders and disciplines is described as “a useful approach to increase city resilience and planning across southern Africa” [97] (p. 1). In addition, Nhamo et al. [89] state that effective policy formulation toward a delineated end in the southern African region is supported by cooperation between disciplines, sectors, and stakeholders across member countries. Opportunities, the authors state, exist to use “scientific and evidence-based policy, monitoring, assessment, and cooperation models” [89] (p. 15) toward the achievement of developmental objectives. Evidently, transdisciplinarity is an important component of resilience research and is a characteristic of delineated

publications on resilience in the SADC. This aids knowledge creation and related evidence that may inform resilience policymaking in the region.

6. Conclusions

The importance of research, and researchers, as sources of evidence in policymaking, is already pronounced in developing regions such as the SADC, particularly during times of global disruption. To optimize the potential contribution of research to policymaking, presented evidence needs to be thematically relevant to the themes inherent to the policy areas and delineate applications to policy. Current research on resilience in the SADC is limited primarily to environmental and social themes, with incorporation of the regional planning scale restricted to a limited number of publications. Existing evidence is also limited in its applicability to regional development policy, with possible interventions that are studied being mostly presented in the context of environmental and social disturbances.

Regional institutions are central to the delineation of policy that supports resilience in the face of diverse potential environmental, economic, and social disturbances. As per the rational approach by policymakers in utilizing research, institutions may use available research or commission additional investigations as sources of evidence in policymaking. According to the strategic and diffusion approaches, research may be used to support existing policy positions or broadly contribute to identifying problems and potential solutions related to strategic objectives among a variety of stakeholders that feed into the policymaking process. Researchers that seek to create knowledge and evidence related to resilience policymaking in the SADC—although this may be extended to researchers in diverse policy areas in different contexts—ought to contribute to overcoming current limitations in available evidence to optimize the contribution of research to policymaking.

Accordingly, to create evidence that is more thematically relevant to resilience policy areas, future areas of research should include broader investigations of potential economic disturbances that face the SADC. This may include, among other themes, reference to specific shocks, their impact and effects, and possible mitigating factors. This research, which is an emerging trend, would complement existing evidence that focuses mostly on environmental and social disturbances. Future research should also be centered on integrating the regional planning scope and scale inherent to resilience policy in the SADC. A limited number of publications emphasize the importance of this planning scale in considering the resilience challenges faced by the SADC, with the effects of disturbances potentially transcending the borders and policy scope of individual member countries. In addition, to create evidence that is more applicable to resilience policy interventions, future research ought to incorporate increased consideration of the strategic objectives, policy instruments, and development policy that are applicable to supporting resilience outcomes. This includes policies that center on the delineation of interventions to achieve regional development objectives, including, *inter alia*, the RISDP, the SADC Climate Change Action Plan, and the SADC Industrialization Strategy and Roadmap.

Future research ought to also build on the existing transdisciplinarity evident in current research. Select publications highlight the need for input from a diverse range of stakeholders and disciplines in the knowledge creation process. This is especially relevant in the context of resilience, where diverse disturbances bring about complex outcomes and factors to be considered toward their mitigation. For researchers on resilience in the SADC, significant opportunities exist in leveraging the new areas of knowledge creation catalyzed by the drive for SDG implementation, which have seen a growth in research on important resilience-related themes.

The aim of this paper was to delineate how current research may support resilience policymaking in the SADC. This paper does not, however, comment on the practical consideration of the evidence presented in previous, current, and future research by SADC institutions and policymakers. In addition, this paper does not interrogate the policymaking process in regional institutions, nor the factors inherent to said process that determine the uptake—or otherwise—of research evidence. These fall outside the scope of the pa-

per and ought to be studied in future research. This paper does, however, contribute to supporting an evidence-based approach to resilience policymaking in the SADC. This is conducted through the use of a bibliometric review and selective content review in identifying limitations in current research and areas of future research to overcome said limitations.

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