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RED SEA DISRUPTIONS: EXPLORING GLOBAL TRADE IMPLICATIONS THROUGH A LITERATURE REVIEW

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Abstract: The Red Sea, a critical maritime link between the Mediterranean and Indian Ocean, faces rising disruptions from geopolitical tensions, regional conflicts, and environmental challenges. This article reviews current research on these issues and assesses their economic impacts on global trade and supply chains. Geopolitical rivalries, such as Saudi-Iran tensions, and conflicts like Yemen's Houthi rebel attacks on shipping, highlight security risks. Environmental issues, including climate change and pollution, complicate trade stability. The findings underscore the need for coordinated international

efforts to mitigate risks and enhance resilience in Red Sea trade, ensuring sustainable global supply chains.

Keywords: Red Sea trade, Geopolitical tensions, Regional conflicts, Global Supply Chain, Resilience.

Introduction.

The Red Sea stands as one of the world's pivotal maritime corridors, located between Africa and Asia, serving as the link connecting the Mediterranean Sea and the Indian Ocean via the Suez Canal. Its strategic position, surrounded by Africa, the Middle East, and Asia, places it at the intersection of essential maritime routes connecting the East and West (Youvan, 2024). However, this corridor faces significant challenges including geopolitical tensions, regional conflicts and environmental issues, which have compromised its stability. Recent conflicts in Yemen and acts of aggression against international shipping have resulted in delays, rerouting of ships and increased shipping costs (Mokaddem, 2024).

This paper aims to review the current state of knowledge on disruptions of Red Sea trade and measure their economic impact. Therefore, the paper seeks to address pivotal questions: *What are the primary drivers of these disruptions and what are their economic impacts on global trade and supply chains?*

To address the complexities of Red Sea trade disruptions, the research results section will present findings in a structured manner. First, it will examine geopolitical tensions. Next, it will analyze regional conflicts and their impacts on shipping vessels. Finally, it will explore environmental challenges affecting trade in the region. The conclusion will synthesize key findings, discuss implications for global trade, and provide recommendations to enhance the resilience of trade networks in the Red Sea region.

Research Results : Overview of current research on Red Sea trade disruptions.

Recent studies have provided insights into the complex disruptions affecting Red Sea trade. This section synthesizes the findings, identifying several factors contributing to the instability of this corridor.

I. Geopolitical tensions.

One of the main drivers of disruptions in Red Sea trade is geopolitical tensions. The Red Sea region is bordered by several countries with complex and often contentious political relationships. Studies have shown that tensions in several locations like the Red Sea, Gulf of Aden, and the Strait of Hormuz continue to escalate into conflicts that threaten maritime security (Boyle-Smith & Dunn, 2024). For instance, the ongoing Saudi-Iran competition has had significant implications for maritime operations in the Red Sea. In addition, United States and European countries, along with China and Russia are reinforcing their military and economic presence in the region to control trade routes and exploit natural resources (Devecioğlu, 2024). Djibouti has thus emerged as a pivotal hub for foreign military presence, hosting naval facilities of the United States, France, Italy, Japan, and China. Russia, in turn, has expanded its influence by signing military cooperation agreements with around 20 African

nations. Despite a failed attempt to negotiate the establishment of its own base in Djibouti, Russia succeeded in reaching an agreement with Sudan in 2020 to host Russian warships. In parallel, Egypt closely monitored these developments with concern, as the increasing presence of foreign navies and military forces in the Red Sea threatens its traditional influence along the western coast, especially in Sudan, leading it to establish a new air and naval base at Berenice seaport in 2020, now the largest military base on the Red Sea (Dunne, 2021).

II. Regional conflicts and attacks on shipping vessels.

In response to the events involving Israel and Gaza that have dominated news headlines since October 2023, a significant security issue emerged in mid-November 2023 in the Red Sea, particularly in the Strait of Bab el-Mandeb (Figure 1). During this period, Houthi rebels in Yemen started targeting international shipping transiting through the region. Within a few weeks, the situation escalated, causing serious disruptions to both shipping and trade (Notteboom et al., 2024). Researchers have also documented incidents in which military posturing and naval blockades have caused congestion, resulting in delays and reroutes towards the Cape of Good Hope (as illustrated in Figure 1 & Figure 2), increased shipping costs, and impacts on other ports in Africa (UNCTAD, 2024). Attacks on commercial ships have also prompted shipping companies to avoid the Red Sea, a critical shipping lane that handles about 15% of global maritime trade volume (Kamali et al., 2024) and over 22,000 transit calls annually (IMF-PortWatch, 2024).

Figure 1

Illustration of the conventional shipping route through the Red Sea and the new route due to rerouting. Data source: U.S. Energy Information Administration using calculations from Vortexa.

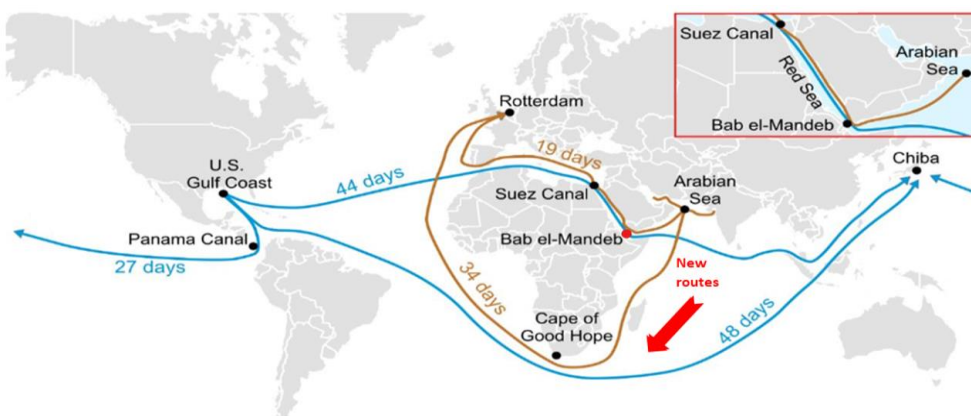
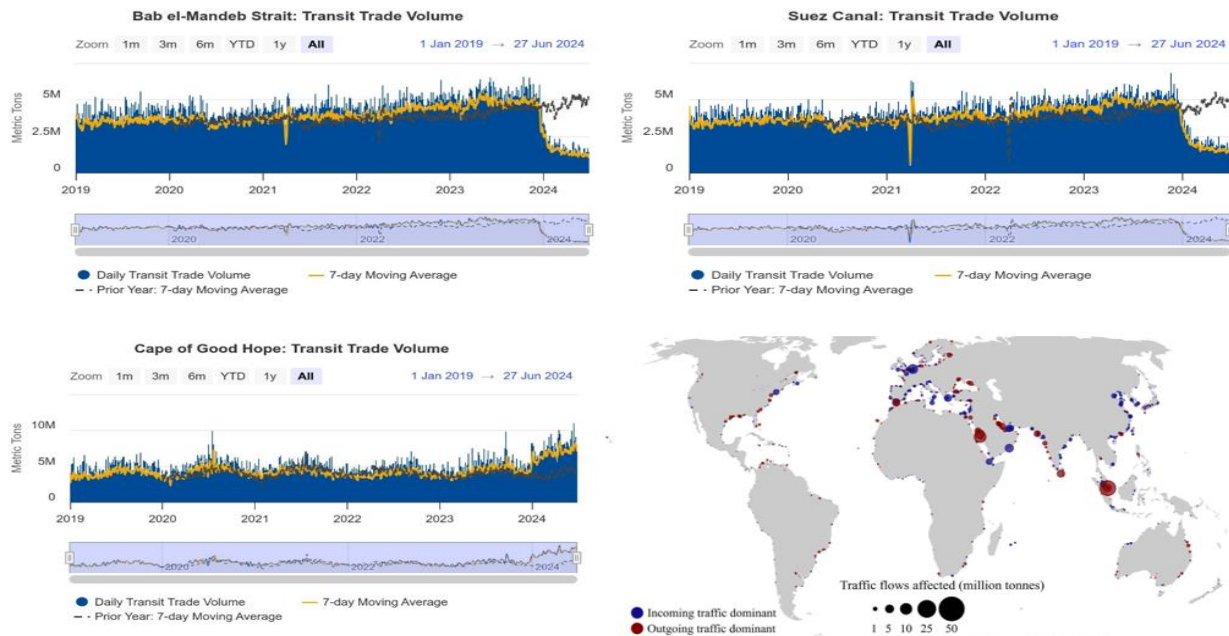


Figure 2

Graphs illustrating the reduction in transit trade volume in Bab el-Mandeb and Suez Canal, alongside the increase at Cape of Good Hope, and the monthly port-level traffic flows at risk from trade disruption in the Red Sea, since December 2023.



Source : (IMF-PortWatch, 2024).

These historical data indicates that such conflicts tend to create unpredictable environments for maritime trade, affecting shipping and logistics dynamics (Notteboom et al., 2024), making it challenging for shipping companies to plan and execute their logistics efficiently.

III. Environmental Challenges.

Environmental challenges, including climate change and marine pollution, have also been identified as significant disruptors of Red Sea trade, as human activities disrupt and pollute the Red Sea's marine ecosystem. Discharges from desalination plants, waste, and agricultural runoff introduce nutrients, hydrocarbons, and heavy metals into marine environments. Moreover, oil spills, estimated at 5,000 tons in the Red Sea, exacerbate this pollution. Other critical issues include bycatch, overfishing, and sea level rise induced by climate change (Abumoghli & Goncalves, 2020). Empirical studies have demonstrated that these environmental challenges can lead to the temporary closure of shipping lanes and ports, causing substantial delays and financial losses (Becker et al., 2018). The Ever Given incident in the Suez Canal is a prominent example of such disruptions, where the vessel grounded due to strong winds and potential navigational errors, blocking one of the world's busiest trade routes for six days (Figure 3). This event underscores the vulnerability of these vital maritime corridors to environmental and operational disruptions, with significant economic repercussions for global trade (Manas Upasani et al., 2024). It has also raised serious concerns about the fragility of international shipping, particularly in narrow waterways.

Improvements in related areas such as navigation systems and the integration of advanced artificial intelligence for predictive navigation capabilities and more, are still in the development or incorporation stage. Incorporating digitalization and advanced intelligence into current navigation systems could greatly enhance their ability to handle extreme weather conditions and other environmental and operational challenges (Khan & Rahman, 2021).

Figure 3

Illustration of the Ever Given Incident in the Suez Canal.



Source: www.cbc.ca (map) and www.ispionline.it (photo).

Conclusions.

The Red Sea faces significant disruptions from geopolitical tensions, regional conflicts, and environmental challenges, all of which threaten maritime security and trade stability. These factors exacerbate complex political dynamics and heighten operational risks for shipping in the region. Economically, these disruptions exert substantial impacts by disrupting global trade patterns and supply chains. Addressing these multifaceted challenges necessitates strong international cooperation to enhance maritime security, adopt advanced navigation technologies, and bolster resilience against geopolitical and environmental risks. Additionally, effective strategies should prioritize diplomatic resolutions to reduce tensions, implement sustainable practices to mitigate environmental impacts, and invest in infrastructure and technology to strengthen global trade networks reliant on the Red Sea route.

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