How does IOS-enabled business intelligence enhance supply chain performance?

By:

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Outline

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- Motivation
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Introduction

• Adoption and use of Inter-organizational information systems (IOS) have grown in recent decades, and have become common tool in many sectors.

• IOS are network-enabled information systems that allow organizations to effectively manage business operations and supply chain activities across several organizations (Asamoah et al., 2020).

• Researchers have identified that adoption and use of IOS can be patterned to achieve three possible objectives; to enable communication, to achieve integration, and to enable business intelligence (Zhang and Cao, 2018; Subramani, 2004).

• In the present era of big data where large volumes of business data are created on a daily basis, deploying IOS for business intelligence has become particular relevant.
Motivation

- Exploring and understanding business data can help firms gain new insights into their operations, customers and market, and this can serve as the foundation of higher performance.

- IOS enabled business intelligence promises to foster the ability of an organization to gain and exploit business data for improved organizational performance (Zhang and Cao, 2018).

- Despite the relevance of IOS enabled business intelligence, studies on the area remains nascent (Mandal and Dubey, 2021).

- Again, little is known about the mechanisms through which how IOS enabled business intelligence improves organizational performance (Mandal and Dubey, 2021).
Research Question

• How does IOS-enabled business intelligence enhance supply chain performance?

• This study takes a deeper look into how IOS-enabled business intelligence may enhance the supply chain performance of firms.

• Specifically, we examine the role of information exchange capabilities, coordination capabilities, integration capabilities, and supply chain responsiveness capabilities.
Theoretical Background

• This study is underpinned by the resource-based view (RBV) theory.

• The RBV theory argues that organizations gain competitive advantage, when they must possess resources that are rare, valuable, inimitable, non-substitutable and can be deployed in manner that is difficult for competitor to replicate (Barney, 1991; Peteraf, 1993).

• We postulate that IOS-enabled business intelligence is resource that can help organizations to gain superior performance.

• Grounded on the RBV, the research model of the study traces the effect of IOS-enabled business intelligence on information exchange capabilities, coordination capabilities and integration capabilities, and how these capabilities subsequently impact on supply chain responsiveness and supply chain performance.
IOS-enabled business intelligence

• The extent to which the use of IOS facilitates learning and knowledge creation between members of a supply chain network (Zhang and Cao, 2018).

- Applications for IOS-enabled business intelligence may take the form of shared database and decision support systems, shared knowledge acquisition, and artificial intelligence (Mandal and Dubey, 2021).

Information exchange capabilities

• The ability of an organization to share relevant information with its supply chain partners effectively and efficiently (Wu et al., 2006; Yeniyurt et al., 2019).
Coordination capabilities
• The ability of organizations to effectively and efficiently coordinate business activities with their supply chain partners (Wu et al., 2006).

Integration capabilities
• The ability of organization to efficiently integrate their internal and external supply chain activities.

Supply chain responsiveness capabilities
• The extent to which members of a supply chain are able to cooperatively respond to changes presented by the environment (Wu et al., 2006; Yeniyurt et al., 2019).
Research model and hypotheses

H1a: Information Exchange Capabilities
H1b: Coordination Capabilities
H1c: Integration Capabilities
H2: IOS Enabled Business Intelligence
H3a: Supply Chain Responsiveness Capabilities
H3b: Supply Chain Performance
H4a: H4b: H5a: H5b: H6:
H7a: INFEX -> SCR -> SCP
H7b: CORD -> SCR -> SCP
H7c: INTG -> SCR -> SCP
Methodology: Measurement items

• Measurement items for the research items were sourced from existing literature (Asamoah et al., 2020; Cao, 2018; Koçoğlu et al., 2011; Won Lee et al., 2007; Zhang and Wu et al., 2006)

• The measures were refined by three professors specializing in business intelligence and practitioner business intelligence experts.

• The measures were also subjected to pilot testing for further refinement.
Methodology: Data collection

- Data for the study was obtained from a survey of firms involved in retail trade in Ghana.

- IOS has seen increasing adoption in the retail operations in Ghana, particularly for fast-moving consumer goods (Asamoah et al., 2020).

- Five hundred firms directly involved in the wholesale and retail of fast-moving consumer goods were randomly selected from a database and targeted for data collection.

- Questionnaires were delivered to these organizations, together with a cover letter explaining the purpose of the study.

- In all, 161 usable responses were received.
Measurement model results

- Measurement model results were assessed by following the guidelines of Hair et al. (2019).

- Indicator loadings were found to be more than 0.708 as required, indicating good item reliability.

- Composite reliability values were greater than 0.7, indicating internal consistency reliability of the research constructs.

- The average variance extracted (AVE) values were larger than 0.5, indicating acceptable convergent validity of the model.
## Psychometric properties of research constructs

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Composite Reliability</th>
<th>AVE</th>
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<tbody>
<tr>
<td>Coordination Capabilities (CORD)</td>
<td>0.916</td>
<td>0.685</td>
</tr>
<tr>
<td>Efficiency (EFF)</td>
<td>0.930</td>
<td>0.767</td>
</tr>
<tr>
<td>Flexibility (FLEX)</td>
<td>0.925</td>
<td>0.712</td>
</tr>
<tr>
<td>Information Exchange Capabilities (INFX)</td>
<td>0.930</td>
<td>0.768</td>
</tr>
<tr>
<td>Integration (INTG)</td>
<td>0.931</td>
<td>0.773</td>
</tr>
<tr>
<td>IOS-enabled business intelligence (INTL)</td>
<td>0.914</td>
<td>0.726</td>
</tr>
<tr>
<td>Reliability (REL)</td>
<td>0.927</td>
<td>0.718</td>
</tr>
<tr>
<td>Supply Chain responsiveness (RESP)</td>
<td>0.905</td>
<td>0.703</td>
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In establishing discriminant validity, we used the Fornell-Larcker criterion and the HTMT (Hair et al., 2019).

**Table 3. Fornell-Larcker test results**

<table>
<thead>
<tr>
<th></th>
<th>CORD</th>
<th>EFF</th>
<th>FLEX</th>
<th>INFX</th>
<th>INTG</th>
<th>INTL</th>
<th>REL</th>
<th>RESP</th>
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<tbody>
<tr>
<td>CORD</td>
<td>0.828</td>
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<tr>
<td>EFF</td>
<td>0.672</td>
<td>0.876</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>FLEX</td>
<td>0.614</td>
<td>0.708</td>
<td>0.844</td>
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<tr>
<td>INFX</td>
<td>0.781</td>
<td>0.664</td>
<td>0.656</td>
<td>0.876</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTG</td>
<td>0.638</td>
<td>0.530</td>
<td>0.492</td>
<td>0.615</td>
<td>0.879</td>
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<tr>
<td>INTL</td>
<td>0.634</td>
<td>0.636</td>
<td>0.645</td>
<td>0.672</td>
<td>0.594</td>
<td>0.852</td>
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<tr>
<td>REL</td>
<td>0.668</td>
<td>0.702</td>
<td>0.701</td>
<td>0.707</td>
<td>0.627</td>
<td>0.664</td>
<td>0.848</td>
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<tr>
<td>RESP</td>
<td>0.717</td>
<td>0.663</td>
<td>0.697</td>
<td>0.765</td>
<td>0.712</td>
<td>0.766</td>
<td>0.726</td>
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**Table 4. HTMT results**

<table>
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<tr>
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<th>INFX</th>
<th>INTG</th>
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<th>RESP</th>
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<tr>
<td>CORD</td>
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<td>0.748</td>
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<tr>
<td>EFF</td>
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<tr>
<td>FLEX</td>
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<td>0.786</td>
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<tr>
<td>INFX</td>
<td>0.867</td>
<td>0.738</td>
<td>0.725</td>
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<tr>
<td>INTG</td>
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<td>0.587</td>
<td>0.545</td>
<td>0.682</td>
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<tr>
<td>INTL</td>
<td>0.717</td>
<td>0.716</td>
<td>0.725</td>
<td>0.757</td>
<td>0.669</td>
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<tr>
<td>REL</td>
<td>0.741</td>
<td>0.782</td>
<td>0.776</td>
<td>0.786</td>
<td>0.696</td>
<td>0.747</td>
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<tr>
<td>RESP</td>
<td>0.816</td>
<td>0.753</td>
<td>0.791</td>
<td>0.868</td>
<td>0.810</td>
<td>0.883</td>
<td>0.825</td>
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Measurement model results

• The predictive relevance of the model was also established since Q2 values ranged from 0.260 to 0.596, which are significantly larger than zero (Hair et al., 2019).

***p < 0.001; **p < 0.01; *p < 0.05; n.s = not significant
Discussion of Findings

• The study found that IOS-enabled business intelligence first allowed organizations to obtain information exchange capabilities, coordination capabilities and integration capabilities.

• We found that IOS-enabled business intelligence enhanced the supply chain responsiveness capabilities of firms.

• Additionally, the study revealed that information exchange capabilities and integration capabilities can be leveraged to achieve higher supply chain responsiveness.
Discussion of Findings

• It was observed that information exchange capabilities, coordination capabilities and supply chain responsiveness capabilities all resulted in higher supply chain performance.

• The study found a partial mediation role of supply chain responsiveness in explaining the effect of information exchange capabilities on supply chain performance.

• Also, the effect of integration capabilities on supply chain performance is fully mediated through supply chain responsiveness.
Implications

• The study provides a detailed understanding of how IOS-enabled business intelligence enhances supply chain performance, by bringing to light the role of supply chain management capabilities in enhancing supply chain performance.

• The study also foments an understanding in the interrelationships between supply chain capabilities that can guide future researchers who are studying supply chain capabilities.

• The study also adds up to the nascent studies on business intelligence within the African context.

• The study also provides insights for owners and managers of firms by creating a clear understanding of how IOS-enabled business intelligence may enhance their supply chain performance.
Conclusion

• The study examined into detail the mechanisms through which IOS-enabled business intelligence enhances the supply chain performance of firms by proposing that supply chain capabilities play an important, individual and staggered role in explaining this relationship.

• The findings of the study largely support the assertions of the study, with IOS-enabled business intelligence enhancing all four identified supply chain management capabilities, and three of the capabilities having a significant effect on supply chain responsiveness and performance.
Thank You