



The moderating effect of ICT capability on the relationship between supply chain agility and competitive advantage of drugstores in Region XI

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Abstract

The intense global business competition has triggered companies to establish effective strategies to realized long-term competitive advantages. The purpose of this study was to determine the moderating effect of ICT capability on the relationship between supply chain agility and competitive advantage and to determine the relationship between supply chain agility, ICT capability, and competitive advantage among 300 drugstores in Region XI in the Philippines. It made use of quantitative research design, specifically the descriptive-correlational. An adapted and modified research instrument was used in gathering the data. Hierarchical logistic regression was used to analyze the moderating effect of ICT capability on the relationship between supply chain agility and competitive advantage. The findings revealed that the overall levels of supply chain agility, ICT capability, and competitive advantage of drugstores are all high. The interrelationship among variables was found to be significant. Finally, supply chain agility and competitive advantage relationships were not significantly moderated by ICT capability.

Keywords: *business management, competitive advantage, supply chain agility, ICT capability, moderating effect*

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Introduction

Today's business world is indeed highly competitive, with global competition intensifying, posing challenges for companies to establish long-term competitive advantages (Abourokbah et al., 2023). As highlighted in the study by Gardner (2019), more than half of small businesses fail within the first five years due to a lack of strategies to maintain a competitive advantage. Moreover, Seeley and Singh (2021) pointed out that drugstores, in particular, are also facing intensifying competition, requiring them to adopt strategies to maintain their competitive advantage. In the global arena, the pharmaceutical industry is grappling with numerous challenges, including drug shortages, high costs, and the complexities of the work (Jorgenson, 2023). These issues are further exacerbated in the Philippines, where the national drug policy is struggling to address specific problems with providing adequate drugs and achieving rational use with systemic issues like staff shortages, poor management, and supply chain bottlenecks (Mina, 2020), while Amazona (2018) cited the absence of licensed pharmacists as a major issue in drugstores.

Competitive advantage is a key determinant of business success and survival, allowing firms to outperform rivals (Wells, 2018). Factors that contribute to competitive advantage in various industries include customer service, product range, and operational efficiency (Jorgenson, 2023). Maintaining a competitive advantage is imperative for drugstores to remain viable and provide quality, accessible healthcare services (InternationalTradeAdministration, 2022). It allows these businesses to provide superior value to their customers, thereby gaining a larger market share (Yuleva-Chuchulayna, 2019). The social relevance of this study lies in its potential to enhance the efficiency and effectiveness of drugstores in Region XI, ultimately benefiting the local community by ensuring the timely and reliable provision of essential pharmaceutical products.

Several studies have highlighted the relationship between supply chain agility (SCA), information and communication technology (ICT) capability, and competitive advantage (CA). The study of Patel and Sambasivan (2021) revealed in their studies that there is a positive relationship between supply chain agility and competitive advantage, which indicates a widespread recognition that the vital component of the supply chain is supply chain agility. Results from the study by Qosasi et al. (2019) indicate that ICT capability

contributes to competitive advantage, emphasizing the role of ICT capability as a key tool in management processes that contribute to sustained competitive advantage for businesses.

Several studies have investigated whether ICT capability moderates the relationship between supply chain agility and competitive advantage. While previous research has explored these concepts separately, the researcher has not yet found a study that combines the three components in a drugstore setting. The proposed study focused on drugstores and examined the potential moderating effect of ICT capability on the relationship between supply chain agility and competitive advantage. By investigating these three components in a specific industry context, the researcher provides valuable insights into the interactions between ICT capability, supply chain agility, and competitive advantage in drugstores. This will contribute to the existing literature on the role of ICT capability in moderating the relationship between supply chain agility and competitive advantage in various industries.

This study sought to determine the moderating effect of ICT capability on the relationship between supply chain agility and competitive advantage of drugstores in Region XI. More specifically, this sought to answer the following research questions:

1. What is the status of the competitive advantage, supply chain agility, and ICT capability of drugstores in Region XI?
2. Is there a significant relationship between: supply chain agility and competitive advantage; and ICT capability and competitive advantage?
3. Is the relationship between supply chain agility and the competitive advantage of the drugstore in Region XI significantly moderated by ICT capability?

Hypothesis

The following null hypotheses were tested at 0.05 level significance:

- Ho1. There is no significant relationship between supply chain agility with competitive advantage and ICT capability with competitive advantage.
- Ho2. ICT capability does not significantly moderate the relationship between supply chain agility and competitive advantage.

Methodology

The study employed a descriptive-correlational design utilizing a moderation analysis to investigate the relationship between supply chain agility, ICT capability, and competitive advantage in the drugstore context. The descriptive research design was used to characterize the population, circumstance, or phenomenon to explore one or more variables without modifying them but merely observing and measuring them (Eyassu et al., 2021). In this study, the descriptive research design was utilized to describe the status of supply chain agility, ICT capability, and competitive advantage in drugstores.

Furthermore, according to Creswell and Creswell (2018), correlation research design is a model that aims to identify and determine the connection between two or more variables, as well as the degree of their existing relationship. In the context of this study, correlation was crucial in understanding the extent to which supply chain agility and competitive advantage were related to each other. Additionally, the study utilized a moderation analysis, which involves exploring the influence of a moderating variable on the relationship between two other variables (Bouichou et al., 2022). In this case, the moderation analysis was employed to explore how ICT capability moderated the relationship between supply chain agility and competitive advantage in drugstores.

The study was conducted in Region XI, Philippines, known for its thriving drugstore industry with a significant number of registered drugstores as stated by Ken Research (2019). The Food and Drug Administration (FDA) reported that there were a sizable number of registered drugstores in the area (Kushwaha, 2022), which led to the selection of the pharmacies in Region XI. Specifically, the study was conducted in selected drugstores located in different parts of Region XI, namely Davao City, Davao del Norte, Davao del Sur, Davao de Oro, Davao Oriental, and Davao Occidental.

According to data from the Food and Drug Administration (FDA), there were 24,660 registered drugstores in the Philippines in 2023, with 1,371 located in Region XI. Data from eFOI (2023) stated that in Davao City, there were 597 drugstores, while Davao del Norte, Davao del Sur, Davao de Oro, Davao Oriental, and Davao Occidental had 335, 162, 133, 110, and 34 drugstores, respectively.

The research had 300 respondents, primarily regular pharmacists managing retail drugstores, who had been engaged in the drugstores for more than one year and were involved in ICT operations related to pharmacy work in Region XI. As suggested by Hair et al. (2018), this sample size was deemed appropriate for conducting business research.

The study employed proportionate stratified random sampling techniques. By using proportionate stratified random sampling, researchers could obtain a representative sample that accurately reflected the characteristics and diversity of the entire population (Hayes, 2023). In this study, the researcher identified the representative population in each of the provinces in Region XI in proportion to the population of drugstores in each province.

The researcher utilized three sets of questionnaires adapted from various authors and validated by experts on questionnaire construction. Additionally, after expert validation, pilot testing took place to guarantee the reliability of the research instruments. The research instruments used a 5 point Likert type scale of which 5- Very High and 1- Very Low.

Competitive Advantage. This survey questionnaire was adapted from Li et al. (2006) and consisted of five dimensions with 16 item constructs. Furthermore, the measurement's reliability score was high, with a Cronbach's alpha of 0.965.

Supply Chain agility. The questionnaire was adapted from Gligor (2013) with a Cronbach's alpha of 0.975. It has five dimensions: alertness, accessibility, decisiveness, swiftness, and flexibility, and consists of a 14-item construct.

ICT capability. The ICT Capability survey questionnaire was adapted from Parida et al. (2016). This tool contains a 13-item construct with a Cronbach's alpha value of 0.970.

The data collection process for this study began with obtaining permission from the Dean of Graduate School. Subsequently, the researcher secured ethical clearance from the University of Immaculate Conception Research Ethics Committee (UIC-REC) to review compliance with policies and guidelines and approve data collection. With the letter of approval from the UIC Graduate School and the certification from the Research Ethics Committee released on October 2023, the researcher wrote a permission letter to 300 drugstore owners, managers, and pharmacists in Region XI through the Food and Drug

Administration via eFOI. After obtaining permission, the researcher began collecting data by contacting pharmacists who met the study's criteria.

Furthermore, the researcher hired enumerators in each municipality to administer the survey. The enumerators were trained and compensated according to the number of survey questionnaires administered. With the approval granted, the researcher began gathering data by providing the list of drugstores per municipality to the identified enumerators. The enumerators then located the respondents who met the study's criteria. After the respondents were identified, the enumerators began administering the survey.

The survey questionnaire was divided into two parts: the informed consent form and the study questionnaire. Each respondent was required to sign the informed consent form before participating. The entire survey questionnaire was expected to take about ten to fifteen minutes. Since the data collection was conducted face-to-face, the entire process was completed within two months, from October to November 2023.

The study utilized these statistical tools to provide a more comprehensive interpretation and analysis of the data gathered. Mean was used to measure the levels of competitive advantage, supply chain agility, and ICT capability in drugstores in Region XI. Standard Deviation (SD) was used to measure the dispersion of a set of data from the mean. The higher the distribution of variability, the greater the SD and the more significant the magnitude of the deviation from the mean's value. The Pearson Product Moment Correlation was used to determine the relationships among competitive advantage, supply chain agility, and ICT capability of drugstores in Region XI. Hierarchical Logistic Regression Analysis and Modgraph were used to ascertain the predictive power of competitive advantage, supply chain agility, and ICT capability of drugstores in Region XI. Further, it was also used to determine the moderating effect of ICT capability on the relationship between supply chain agility and competitive advantage.

Findings

The status of Competitive Advantage (DV) has an overall mean of 4.07, described as high. This means that Competitive Advantage is evident most of time in the drugstores. This

finding supports the study of Holdford (2018) that an evidence-based pharmacy practice and business's long-term success depends on its unique resources and capabilities as well as business strategies in terms of price, quality, delivery dependability, innovation and time to market. Likewise, Supply chain agility (IV) got an overall mean score of 4.12, indicating that supply chain agility is evident most of the time among drugstores in Region XI. This high mean value suggests that drugstores are well-equipped to adapt and respond effectively to dynamic market conditions. This is consistent to the idea of Chen (2019) who emphasized the significance of supply chain agility and innovativeness in enhancing firms' competitive advantage. Moreover, the high mean value of ICT capability (ModV), with a mean of 3.76, suggests that ICT capability was most of the time manifested in drugstores of Region XI, which could significantly influence competitive advantage. These findings align with the study by Yunis et al. (2017) emphasized the impact of ICT-based innovations, highlighting the emphasis on leveraging ICT to enhance operational capabilities and potentially drive competitive advantage within the sector.

The correlation between supply chain agility and competitive advantage, as shown in the table, demonstrates a significant and strong positive relationship ($r = .698$, $p < 0.05$) between these variables, thus rejecting the null hypothesis that there is no significant relationship between supply chain agility and competitive advantage. This demonstrates that as supply chain agility increases, competitive advantage also increases within the pharmaceutical industry. This correlation is aligned with the study of Isfianadewi and Anindityo (2022), which found that supply chain agility has a positive and significant association with competitive advantage. Similarly, the correlation ($r = 0.565$, $p < 0.05$) between ICT capability and competitive advantage indicates a positive relationship, leading to the rejection of the null hypothesis. This implies that as ICT capability increases, competitive advantage also increases, signifying a significant relationship between the two, in corroboration with the study of Qosasi et al. (2019).

Furthermore, the hierarchical regression analysis which was employed to test the hypothesis on moderating effect. The independent variable, supply chain agility, was entered into the hierarchical procedure as step one. The first model only includes the variable of supply chain agility. The unstandardized coefficient (B) is 0.682, and the standardized coefficient (Beta) is 0.698. The t-value is 16.805 ($p < 0.05$), indicating that supply chain

agility significantly predicts competitive advantage. The R squared change is 0.487, indicating that supply chain agility explains about 48.7% of the variance in competitive advantage. This aligns with previous studies by Isfianadewi and Anindityo (2022), and Patel and Sambasivan (2021) that have established a positive relationship between agile supply chain capabilities and competitive advantage.

Moving to the second model, the addition of ICT capability alongside supply chain agility further enhances the predictive power for competitive advantage. Both supply chain agility and ICT capability exhibit significant positive relationships with competitive advantage, as indicated by their unstandardized coefficients of supply chain agility and ICT capability of 0.541 and 0.166, respectively, and both variables exhibited significant levels ($p < 0.05$), indicating both variables predict competitive advantage in their capacities as separate variables. The R squared change of 0.053 indicates that the inclusion of ICT capability explains an additional 5.3% of the variance in competitive advantage. The study by Yunis et al. (2017) emphasized the impact of ICT innovations, highlighting the potential of ICT capability to make a difference in organizational performance. This indicates a strong emphasis on leveraging ICT to enhance operational capabilities and potentially drive competitive advantage within the sector.

However, in the third model, which introduces an interaction term for supply chain agility and ICT capability, the results show that the interaction between these two variables is not a significant predictor of competitive advantage. The unstandardized coefficient for this interaction term is -0.029, and the standardized coefficient is -0.264. The t-value is -0.878 ($p > 0.05$) with a minimal R square change of 0.001.

In addition to the hierarchical regression analysis, the results support the hypothesis that ICT capability does not significantly moderate the relationship between supply chain agility and competitive advantage. For instance, Dubey et al. (2019) and Tarafdar and Qrunfleh (2016) highlighted that IS capability for agility plays a crucial role, but it may not act as a significant moderator in the relationship between supply chain agility and competitive advantage. The study by Chen (2019) claimed that ICT capability does not significantly moderate the relationship between supply chain agility and competitive advantage.

On the contrary, there are also studies that provide evidence contradicting the hypothesis. Qosasi et al. (2019) found that business agility strengthens the indirect link between ICT capability and competitive advantage, signifying that ICT capability may play a moderating role in improving competitive advantage through business agility. Ullah and Narain (2021) stated that the use of ICTs has a significant impact on the relationship between their dynamic capabilities and their performance, indicating that ICT capability may have an impact on organizational performance through dynamic capabilities.

To validate the result of the regression, a modgraph was provided to visually verify the result of the regression from the interaction. The graph showed three parallel lines, according to Jose (2013), a graph showing three parallel lines implies that the moderator has no interaction with the main effect. This means that at high or low level of ICT capabilities, the effect of supply chain agility on competitive advantage of drugstores in Region XI is depicted to be the same. It implies that changes in the levels of ICT capabilities do not significantly affect the variation in supply chain agility in an attempt to influence competitive advantage. Although the result revealed that there is no significant moderating effect of ICT capabilities on the relationship between supply chain agility and competitive advantage, relationship between variables was established through correlation. The positive relationship between supply chain agility, ICT capabilities, and competitive advantage aligns with the resource-based theory of competitive advantage (Holdford, 2018) and support the concepts of supply chain agility (Gligor, 2020) and pharmacy informatics (Cortes, 2019), which involve the adoption of ICT capabilities to improve pharmaceutical service delivery.

Conclusion

Based on the findings of the study, it is evident that the drugstores exhibit a very high level of competitive advantage, particularly in terms of quality and price, and a high level of delivery dependability, product/service innovation, and time-to-market. The drugstores also demonstrate a very high level of supply chain agility, particularly in terms of accessibility, as well as high alertness, flexibility, decisiveness, and swiftness. Additionally, the drugstores' ICT capability is reported to be high.

The study also establishes a significant relationship between supply chain agility and competitive advantage, as well as between drugstores' ICT capability and competitive advantage. However, it is noted that ICT capability does not moderate the relationship between supply chain agility and competitive advantage.

Theory confirmation. The findings of the study align with Porter's Theory of Competitive Advantage, emphasizing the capacity of an industry to innovate and upgrade as a key determinant (Porter, 2023). The drugstores' high level of competitive advantage, supply chain agility, and ICT capability are in line with Porter's theory, focusing on local market demand conditions, factor conditions, related and supporting industries, firm strategy, structure, and rivalry (Fainshmidt et al., 2016). Supply chain agility provide strategic advantages and innovations to respond to market uncertainty, aligning with Porter's emphasis on innovation and local market demand conditions (Rahman, 2021). The role of ICT capability emphasized the role of local market resources and capabilities in determining competitiveness (Nugraha et al., 2022). Additionally, the study by Chen (2019) demonstrated IT integration positively affects a firm's competitive advantage, aligning with Porter's emphasis on local market demand conditions and related industries as determinants of competitive advantage.

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