Supply chain management as a mediator between technological marketing orientation and export performance

**Michal Levi Bliech1 and Gavriel Dahan2**

1Western Galilee College, School of Management, Logistics Department

2Western Galilee College, School of Management

**Abstract**

**Purpose:** The main objective of this study is to examine the role of supply chain management (SCM) as a mediator between technological marketing orientation (TMO) and export performance (EXPERF) of firms.

**Design/methodology/approach:** The research model was developed based on knowledge-based view (KBV) theory and designed using a quantitative approach. The analyses in this study were carried out using SmartPls4 software. The sample included 231 managers from diverse international firms across Europe.

**Findings:** The main findings of this study show that TMO positively affects EXPERF. Additionally, SCM provides partial mediation in the relationship between TMO and EXPERF.

**Practical implications:** The findings provide several practical guidelines for marketing managers and organizations. Managers should pursue technological resources to improve their marketing strategies. Moreover, organizations should carefully manage their supply chains in collaboration with all parties in the chain, including suppliers and customers.

**Originality/value:** This research provides new conceptual and operational insights that enrich the body of knowledge regarding the relationships between SCM, TMO, and EXPERF.

**Paper type:** Research paper.

**Keywords:** supply chain management,technological marketing orientation, export performance, mediation

**INTRODUCTION**

Technological development in the last two decades has led companies to change their perceptions in regard to improving their marketing capabilities and managing their supply chains. Here, numerous studies have separately examined the relationship between technological marketing orientation and firm performance, as well as the effect of the supply chain on firm performance. Furthermore, previous studies have identified the relationship between information communication technologies (ICT) and supply chain performance (Agrawal & Narain, 2018; Hou & Chen, 2022; Levi-Bliech et al., 2018; Walton et al., 1998).

However, limited literature has examined the role of supply chain management (SCM) as a mediator in enhancing export performance through investments in technology with a marketing orientation. While some works have addressed the direct effects of technologies with marketing orientation on export performance (Chetty & Hamilton, 1993; Hortinha et al., 2011), the mediation mechanism of the supply chain has not been thoroughly explored.

Contrary to earlier research, this study seeks to examine the mediating effect of the supply chain on the relationship between technological marketing orientation (TMO) and firms’ export performance (EXPERF) in one integrative model. The uniqueness of this research is expressed in two ways. First, it combines two organizational aspects (marketing and logistics) in the same model, which has not been undertaken previously. Second, it emphasizes the firm’s performance as EXPERF in global and international markets. It provides new conceptual and operational insights that enrich the body of knowledge on SCM by examining the mediation effect between TMO and EXPERF.

Accordingly, the research question that arises from this background is: What is the extent of the impact of technological marketing orientation on export performance via the mediation of supply chain management? To address this question, this study draws upon knowledge-based view (KBV) theory to explore organizational performance (Cooper et al., 2023). Such an approach proves particularly insightful when seeking an in-depth understanding of managerial perspectives on the impacts of emerging technologies on organizational performance and TMO.

The distinctive contribution of this study lies in highlighting the importance of SCM in a globally connected environment where business competition occurs among supply chain networks. It is posited that merely investing in technological resources, such as AI, cloud computing, and marketing 4.0, is insufficient to directly enhance EXPERF. Instead, managers in this interconnected landscape should recognize the potential of leveraging the supply chain as a mediator to gain a competitive advantage in EXPERF. Diverging from prior studies that predominantly focus on the direct effects of TMO (Chetty & Hamilton, 1993; Hortinha et al., 2011), this research delves into the comprehensive mediating effect of SCM and elucidates the mechanisms through which technologies with a marketing orientation impact export marketing performance. Therefore, the main purpose of this study is to examine the role of SCM as a mediator between TMO and EXPERF of firms.

The next section contributes to the literature review, elaborating on KBV theory and research model constructs such as TMO, SCM, and EXPERF. In this research model, three hypotheses were formulated to explore the mediating role of SCM and the direct impacts of TMO on EXPERF. The subsequent section delves into the survey methodology, followed by sections covering data analysis, discussion, and conclusions.

**LITERATURE REVIEW**

**Theoretical framework**

This study is based on KBV theory, which is a strategic management theory that highlights the importance of knowledge, information, and intellectual assets in creating and sustaining a competitive advantage for organizations. KBV has an enormous influence on strategic management research, especially within the global arena (Grant & Phene, 2022, p. 152). The main notion of this theory is that knowledge, rather than tangible assets, such as physical resources or financial capital, is the most valuable resource for organizations.

This study focuses on TMO and considers it as an organizational resource that assist in acquiring technological knowledge. Tsou et al. (2014, p. 501) argued that “firms that acquire and use their technical knowledge are able to create new technical solutions by exploiting their existing knowledge and exploring new knowledge to address customer needs.” Grant (1996) noted that an organization’s performance is improved when knowledge is managed efficiently. Similarly, Cooper et al. (2023) concluded that KBV promotes a firm’s performance outcomes, such as innovation, product development, organizational performance, financial performance, sustainability, and internationalization.

**Technological marketing orientation**

Technological marketing orientation (TMO) is one of many organizational strategies that guide managers on how to think and act, especially within a changing technological environment. It reflects an organization’s ability to learn new technologies and use technological advancement to solve problems and achieve its goals. Danneels (2007) noted that technology-oriented firms are technically expert and flexible, enabling the modification of existing technologies to develop products and intellectual property.

TMO refers to an organization’s openness to new ideas and its tendency to embrace new technologies throughout product development (Tsou et al., 2014). Moreover, Masa’deh et al. (2018) argued that technological orientation is a central pillar of the organization and includes technical capabilities and R&D resources that help to promote innovation and bring better designed products to the market. Similarly, Lichtenthaler (2016) offered that technology orientation involves a strong commitment to R&D. Accordingly, this study focuses mainly on TMO.

In the era of digital technologies, organizations are heavily invested in their integration within marketing, leading to advanced TMO (Jara et al., 2012; Vassileva, 2017). This shift is influenced by the rapid growth of technologies that handle information, a result of expanding global markets (Dholakia et al., 2010). Information not only acts as a vital organizational resource but also enables marketing to adeptly manage information flow (Achrol & Kotler, 1999; Luggen, 2004; Piercy, 1984) via emerging digital tools such as big data analysis and client segmentation methods (Sundararajan et al., 2022). Graesch et al. (2021) posited that ICT has catalyzed the transformation of digital marketing through automation, advanced tools, enhanced communication, and data analysis. Digital technologies offer real-time insights into global commerce and consumer patterns via social networking (Rosário & Dias, 2022), pushing TMO toward a consumer-centric digital focus (Vassileva, 2017).

**Supply chain management**

Du Toit and Vlok (2014) stated that the conventional approach to supply chain management (SCM) involves the movement of raw materials upstream from suppliers through organizations to customer delivery. Furthermore, Min (2019) and Takahashi (2017) defined SCM as the upstream flow of raw materials, products, and services from suppliers to end customers. SCM also includes the downstream flow of information, transactional data, and payments (Andonova & Losada-Otálora, 2020; Mentzer et al., 2001).

Various studies have examined the significance of upstream integration and its positive impact on supply chain performance (Rich & Hines, 1997; Walton et al., 1998). Correspondingly, research in the field of downstream integration has emphasized the importance of collaborating with the customer in the company’s operational procedures (Reaidy et al., 2021; Zhang et al., 2023).

ICT developments, such as the Internet-of-Things (IoT), Big Data, 3D, and Industry 4.0 (Agrawal & Narain, 2018; Hopkins, 2021; Hou & Chen, 2022; Queiroz & Telles, 2018), affect the business environment of collaboration and information sharing along the supply chain (Kopanaki et al., 2018; Levi-Bliech et al., 2018). In the current highly competitive environment, organizations must embrace state-of-the-art manufacturing technologies such as 3D printing, rapid prototyping, and leveraging the IoT to gather information and conduct analysis to enhance their manufacturing operations (Agrawal & Narain, 2018). In addition, manufacturers seek collaboration with their suppliers and customers via ICT to improve service quality, promote technological integration, and enhance product design and quality (Gunasekaran et al., 2004). As a result, customer satisfaction and loyalty improve (Adam et al., 2020; Agrawal & Narain, 2018; Cheshmberah et al., 2011).

Adam et al. (2020) stated that the digital supply chain significantly impacts consumer satisfaction and loyalty, helping to drive business growth and a competitive environment in the digital age. Digital marketing enables communication and provides added value to supply chain partners by better understanding customers’ needs and knowledge (Ismail, 2017; Kannan, 2017). In today’s environment, companies should also be able to adapt their business strategies to cater to the ever-evolving demands of their customers (Agrawal & Narain, 2018).

Consumers’ purchasing habits and preferences are significantly impacted by several factors, such as widespread internet usage, easy access to new information, and the ability to compare product features and pricing via the internet (Amine Belhadi, 2023). Finally, customer integration and collaboration enable knowledge transformation, which enhances the overall operational efficiency of the supply chain and leads to improvements in customer satisfaction, product variety, and innovation.

**Export performance**

*Export performance* (EXPERF) relates to the firm’s overall activity and expresses its business outcomes in global and international markets. Several studies have defined and conceptualized EXPERF in various ways. For example, Shoham (1996) defined EXPERF as the composite outcome of a firm’s international sales. Chetty and Hamilton (1993) described it through several characteristics, such as propensity to export, export sales, export problems, level of export, export growth intensity, and so on.

Zou et al. (1998) conceptualized and developed the EXPERF scale, a three-dimensional construct that aims to measure the firm’s EXPERF from different points of view. The EXPERF scale dimensions are: *financial performance*,reflected as bottom-line performance including sales volume, profits, and achieved growth; *strategic performance*, which reflects the firm’s ability to meet strategic goals, such as improved competitiveness, increased market share, and strengthened strategic position; and *satisfaction performance*, which examines the extent to which the organization’s performance has met its expectations.

In this study, we adopted the conceptualization of Zou et al. (1998) concerning the EXPERF scale, since we focused on Israeli companies that are active only in international markets and this model offers us the most effective way to measure EXPERF.

**Research model**

In line with KBV theory and the literature review, a research model was developed (Figure 1) to examine the relationship between TMO and EXPERF via the mediation of SCM. This study considers both TMO and SCM as key drivers for improving firm performance, especially in global markets.



**FIGURE 1.** Research model

**HYPOTHESES DEVELOPMENT**

***Technological marketing orientation and export performance***

“Export performance is seen as an outcome of standardizing or adapting marketing strategies” (Shoham, 1996, p. 53). The relationship between technological orientation and EXPERF has already been examined in the research literature. Zou and Stan (1998) reviewed the literature between 1987 and 1997 and determined that the technology level of a firm has been shown to have a positive effect on EXPERF. For example, Chetty and Hamilton (1993) found a positive effect of firm technology on EXPERF. Moreover, Hortinha et al. (2011) found that technology orientation affects EXPERF via the mediation of exploitative innovation.

Arthur Solberg and Olsson (2010) found that technology orientation correlates positively with EXPERF. Additionally, exporters who have varied technological knowledge get more opportunities and tend to develop more innovative products (Quintana-García & Benavides-Velasco, 2008). Following the above, we can assume that:

**H1:***TMO is positively related to EXPERF.*

***Technological marketing orientation and supply chain management***

In today’s fast-paced technological landscape, supply chains must continuously strive to enhance their competitive edge amidst cutthroat competition. Therefore, stakeholders are interested in developing and promoting technological orientation (Mubarak et al., 2019). Several researchers have found that ICT may contribute to various aspects of SCM (Hou & Chen, 2022; Levi-Bliech et al., 2018; Rossi et al., 2007; Tseng & Liao, 2015).

A supply chain network that adapts and develops ICT, for instance through cloud computing or blockchain technology (Agrawal & Narain, 2018; Hopkins, 2021; Kopanaki et al., 2018; Min, 2019), enhances performance from the manufacturing environment to customer satisfaction via adaptation to market demand (Kopanaki et al., 2018) through technological changes (Vassileva, 2017). According to Ardito et al. (2018), the integration of SCM and marketing orientation is enabled by digital technologies such as cloud computing, IoT, and cyber security.

TMO acts as a catalyst, enhancing the customer experience through tools such as virtual reality, IoT, Big Data, 3D, Industry 4.0, and Marketing 4.0 (Hopkins, 2021; Hou & Chen, 2022; Jara et al., 2012; Kopanaki et al., 2018; Vassileva, 2017), thereby streamlining marketing strategies, improving customer service, and fostering innovative product development (Borges et al., 2009; Jagodič & Milfelner, 2022; Vassileva, 2017). Therefore, TMO should be seen as an enabler (Graesch et al., 2021) for improving customer satisfaction and developing new products and services in the supply chain. Thus, we propose the following hypothesis:

**H2:** *TMO is positively related to SCM.*

***Supply chain management and export performance***

Piercy et al. (1998) stated that solid supply-chain capabilities improve export competitiveness. Hindrawati and Sari (2022) examined the furniture industry in Malaysia and confirmed the relationship between SCM and EXPERF. In addition, supply chain integration with customers and within the organization was found to be positively correlated with EXPERF (Abdallah et al., 2021); however, in contrast, the same research found integration with suppliers to be insignificant.

Ling-yee and Ogunmokun (2001) claimed that SCM export capabilities might upgrade a firm’s competitive advantage. Al-Ghwayeen and Abdallah (2018) in addition to Ikram and Siddiqui (2019) identified a positive correlation between green SCM and EXPERF in developing countries. The positive correlation is due to SCM’s capabilities to enhance business process performance, such as efficiency, quality, cost, innovation flexibility, and sustainability (Levi-Bliech et al., 2018). In addition, SCM facilitates information sharing (Lazarova & Sapundzhi, 2023; Pham et al., 2019), integration (Abdallah et al., 2021), collaboration (Gunasekaran et al., 2004; Takahashi, 2017), and cooperation, which, according to Hyun (1994), facilitate competitive advantage. Thus, we can argue that:

**H3:** *SCM is positively related to EXPERF.*

**METHODOLOGY**

**Data collection and questionnaire**

This study’s data collection was facilitated by Cint (http://www.cint.com), a global enterprise with a specialization in online surveys. Holding the ISO 20253 quality certificate, Cint works in collaboration with over 4,500 survey panels spanning 130 nations. In August 2022, the company took charge of distributing the questionnaire in Europe and gathering the relevant data. Surveys are a strong tool to glean insights into behavioral trends, experiences, and viewpoints, as evidenced by studies such as Bulmer and Warwick (1983), Kelley et al. (2003), and Launiala (2009), especially when exploring fields such as SCM and marketing management (Cachon & Netessine, 2006; Marbun et al., 2020; Rao, 2002).

The research instrument was bifurcated in two. The initial parts contained targeted screening queries such as age, profession, and professional tenure to pinpoint appropriate respondents. The subsequent part featured Likert scale prompts (ranging from 1 to 7) extracted from previously authenticated research.

**The sample**

The sample comprised 231 managers from diverse international firms across six European countries: France, Germany, Italy, the Netherlands, Spain, and the UK. These managers hailed from nine distinct sectors and all were English speakers. A substantial portion of these managers (84, 36.80%) had responsibilities for over 500 employees (see Table 1). In terms of decision-making domains, finance had 90 managers (31.6%), computing IT had 91 (39.4%), and sales and marketing had 106 (45.9%), while supply chain and logistics led with 115 managers (49.8%). It is notable that respondents had the flexibility to select multiple areas in the decision-making domain. The majority (154) of the respondents were male, accounting for 66.7% of the sample.

**Table 1. Demographic breakdown of the sample**

|  |  |  |
| --- | --- | --- |
| Characteristic (Valid N=231) | Frequency | Percent |
| Decision making area  |   |   |
| Finance | 73 | 31.60% |
| Logistics | 75 | 32.50% |
| Procurement | 38 | 16.50% |
| Human resource | 59 | 25.50% |
| Business development | 55 | 23.80% |
| Computing IT | 91 | 39.40% |
| Sales | 57 | 24.70% |
| Marketing | 49 | 21.20% |
| Supply chain | 40 | 17.30% |
| Gender  |   |   |
| Male | 154 | 66.70% |
| Female | 77 | 33.30% |
| Major occupation  |   |   |
| Full-time employee | 217 | 93.30% |
| Self-employed | 14 | 6.10% |
| Job description  |   |   |
| Business owner | 17 | 17.10% |
| Manager with employees | 183 | 79.20% |
| Manager without employees | 21 | 9.10% |
| Management level  |   |   |
| General manager | 41 | 17.70% |
| Intermediate level manager | 93 | 40.30% |
| Senior manager | 80 | 34.60% |
| Vice general manager | 17 | 7.40% |
| Organization size  |   |   |
| 21-99 employees | 69 | 29.90% |
| 100-500 employees | 77 | 33.30% |
| 501+ employees  | 84 | 36.80% |

**Variables measurement**

The variables measurement of this study was done using validated scales from previous studies in the fields of logistics and marketing. These scales utilized seven-point Likert-type scales, where respondents could indicate their level of agreement on a spectrum ranging from 1 (strongly disagree) to 7 (strongly agree). The TMO variable was taken from Leng et al. (2015) and included four items. The SCM variable was taken from Levi-Bliech et al. (2018) and included twelve items divided into three dimensions (suppliers, organization, and customers). The EXPERF variable was taken from Zou et al. (1998) and included nine items divided into three dimensions (financial, strategic, and satisfaction).

**Analysis method**

The data analysis of this study was conducted using SmartPLS4 software via the partial least squares structural equation modeling (PLS-SEM) method. The advantage of this software is reflected in its ability to analyze complex models. According to Dash and Paul (2021), the researcher’s decision on which analysis method to use depends on the research goals. PLS- SEM is mostly used for exploratory research, but it is also applicable for confirmatory research (Sarstedt et al., 2014).

Hair Jr et al. (2017) noted that the use of PLS-SEM has grown dramatically in recent years and recommended using this method due to its ability to obtain meaningful solutions in almost any problematic situation, such as small sample sizes or non-normal data distributions. Since in this study the research model is based on theory and our objective is to confirm relationships between several variables, PLS-SEM analysis is an appropriate method to use.

**Parceling method**

Before analyzing the study’s model, we used the parceling method to redefine some variables of this study. Parceling is a technique that aggregates variable items (mostly by average or sum) into one or more parcels and uses those parcels (instead of the variable items) as indicators of the latent variable (Kishton & Widaman, 1994). It is used mainly in latent-variable analysis techniques, such as SEM (Little et al., 2002). Coffman and MacCallum (2005, p. 238) noted that “using parcels rather than items as indicators of latent variables involves the reduction in the number of measured variables in a model.” Bandalos and Finney (2001) argued that parceling helps to improve reliability, achieving normal distribution and fit to small sample sizes, and leads to better model fit statistics. Little et al. (2002, p. 152) noted that “parceling is a measurement practice that is used most commonly in multivariate approaches to psychometrics, particularly for use with latent-variable analysis techniques (e.g., exploratory factor analysis, SEM).”

Accordingly, this study uses the parceling method in order to improve the statistical estimations and ensure the model’s efficiency. As can be seen in Table 2, the SCM variable was divided into three parcels in which items SCM1–SCM4 were aggregated (by average) into the suppliers parcel (SUP), items SCM5–SCM8 were aggregated into the organization parcel (ORG), and items SCM9–SCM12 were aggregated into the customers parcel (CUS).

Similarly, the EXPERF variable was divided into three parcels in which items PERF1–PERF3 were aggregated (by average) into the financial parcel (FIN), items PERF4–PERF6 were aggregated into the strategic parcel (STRA), and items PERF7–PERF9 were aggregated into the satisfaction parcel (SATIS).

**Table 2.** Parcels definition

|  |  |  |  |
| --- | --- | --- | --- |
| Items | Name of parcel | Label | Variable |
| SCM1SCM2SCM3SCM4 | SUP | SCM | Supply Chain Management |
| SCM5SCM6SCM7SCM8 | ORG |
| SCM9SCM10SCM11SCM12 | CUS |
| PERF1PERF2PERF3 | FIN | EXPERF | Export Performance |
| PERF4PERF5PERF6 | STRA |
| PERF7PERF8PERF9 | SATIS |

**Controlling common method variance**

Common method variance (CMV) is a “variance that is attributable to the measurement method rather than to the constructs the measures represent” (Podsakoff et al., 2003, p. 879). CMV may produce a bias among the research participants because of the systematics of data collection. In order to control for CMV, we carried out several actions to avoid any bias within the respondents. First, before the respondents answered the questionnaire, they were told that their answers would be kept confidential and anonymous; therefore, they could answer the questions freely and without fear. Second, according to the recommendation of Chang et al. (2020), we ensured independency between the variables by using variable measures from different information sources. Third, in order to avoid a sequence of systematic answering, we planted within the questionnaire several “marked” items – items that are theoretically unrelated to the other items (Lindell & Whitney, 2001).

After collecting the data, we carried out several statistical analyses. First, we used Harman’s single-factor test, a method that loads all the items from each variable into one single factor. Then, we examined the confirmatory factor analysis of this single factor. The results showed that no one single factor emerged. This allows us to conclude that there is no CMV. Second, based on‏ Lindell and Whitney (2001), we calculated the correlations between the “marked” items and the other measured variables. The correlations were relatively low and not significant. Thus, we can assume that there is no evidence for CMV. Third, we calculated variance inflation factors (VIF) to test multicollinearity among the variables. The results showed that all VIFs were low and less than the critical value (Hair Jr et al., 2021).

**Measurement model**

Figure 2 describes graphically the measurement model with reflective measurement. Hair et al. (2012) noted that this step involves several assessments, such as reliability, internal consistency reliability, convergent validity, and discriminant validity, as specified below.



**FIGURE 2.** Measurement model

***Reliability and*** ***internal consistency reliability***

In order to ensure the reliability and internal consistency reliability of our measurements, we calculated Cronbach’s alpha and the composite reliability (CR) of each variable. As can be seen in Table 3, the values of Cronbach’s alpha and CR met the threshold of 0.7 (Wong, 2013). Therefore, we can argue that reliability was achieved, enhancing the strength of our findings.

**Table 3.** Outer loadings, CR and AVE of measurement model

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| AVE | CR | Cronbach's alpha | OuterLoadings | Indicators | Label | Variable |
| 0.67 | 0.84 | 0.83 | 0.790.870.790.82 | TO1TO2TO3TO4 | TMO | Technological marketing orientation |
| 0.81 | 0.89 | 0.88 | 0.920.870.91 | SUPORGCUS | SCM | Supply chain management |
| 0.84 | 0.91 | 0.90 | 0.910.910.93 | FINSTRASATIS | EXPERF | Export performance |

CR = composite reliability, AVE = average variance extracted.

***Convergent validity***

*Convergent validity* is defined as “the extent to which a measure correlates positively with an alternative measure of the same construct” (Hair Jr et al., 2021, p. 112). In order to examine theconvergent validity, we calculated the average variance extracted (AVE) of each variable. As can be seen in Table 3, the AVE values were higher than 0.5 and met the threshold recommended by Wong (2013). Therefore, we can argue that convergent validity was supported.

***Discriminant validity***

Ab Hamid et al. (2017, p. 2) defined discriminant validity as “the extent in which the construct is actually differing from one another empirically.” In order to examine the discriminant validity, we used Fornell and Larcker’s (1981) test. Table 4 presents the results. As can be seen in Table 4, the square root of each variable’s AVE (bolded in the diagonal) is higher than the correlation with any other variable. Therefore, we can assume that discriminant validity was achieved.

**Table 4.** Results of Fornell-Larcker test

|  |  |  |  |
| --- | --- | --- | --- |
|   | TMO | SCM | EXPERF |
| TMO | **0.82** |  |  |
| SCM | 0.78 | **0.90** |  |
| EXPERF | 0.74 | 0.79 | **0.92** |

**Structural model**

After establishing the measurement model, the next step of the analysis was to examine the structural model of this study. According to Wong (2013), this step includes the reporting of R2 coefficients and testing the study’s hypotheses. R2 refers to the explained variance of exogenous variables on endogenous variables. The R2 of the relationship between TMO and SCM was 0.67, meaning that TMO explained 67% of the SCM. Additionally, TMO and SCM together explained 60% of the EXPERF, which indicates a considerable influence of the independent variables on the dependent variable.

***Hypotheses results***

In order to test the study’s hypotheses, we used the bootstrap method in Smart PLS 4. This procedure included 5,000 bootstrap samples (Hair et al., 2012). As can be seen in Table 5, all the study’s hypotheseswere supported (*p* < .001). Specifically, the results show that in *direct effect*, TMO had a positive effect on EXPERF. Hence, H1 was supported (t = 4.02, *p* < .001). Moreover, in *total effect*s, the findings show that TMO positively affected both EXPERF and SCM and that SCM positively affected EXPERF. Therefore, H1, H2, and H3 were supported (*p* < .001).

**Table 5.** Results of hypotheses tests

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Hypothesis | Path | Β | STDEV | T | *P*  | Result |
| Direct effect |  |  |  |  |  |  |
| H1 | TMO → EXPERF | 0.33 | 0.08 | 4.02 | 0.00\* | Supported |
| Specific indirect effect |  |  |  |  |  |  |
|  | TMO→ SCM → EXPERF | 0.42 | 0.06 | 6.68 | 0.00\* | Supported |
| Total effects |  |  |  |  |  |  |
| H1 | TMO → EXPERF | 0.74 | 0.04 | 20.10 | 0.00\* | Supported |
| H2 | TMO → SCM | 0.78 | 0.03 | 25.35 | 0.00\* | Supported |
| H3 | SCM → EXPERF | 0.54 | 0.07 | 7.14 | 0.00\* | Supported |

\**p* < .001; All tests are two-tailed.

**DISCUSSION**

The main goal of this study was to examine the impact of TMO on EXPERF on two levels – first at a direct level and then via the mediation of SCM. This study fills a gap in the literature by exploring the mediating role of SCM in the relationship between TMO and a firm’s EXPERF. As presented in Table 5, the impact of TMO on EXPERF both in direct effect and via the mediation of SCM was found to be significant. Hence, we can conclude that SCM has a partial mediation effect in the relationship between TMO and EXPERF.

In line with KBV theory, this study dealt with two different disciplines (marketing and logistics) and showed that a diverse combination of disciplines within the organization may improve the firm’s EXPERF. Accordingly, organizations that wish to achieve a competitive advantage over their competitors should strengthen their SCM in terms of integration, communication, and collaboration with all parties in the chain, including suppliers and customers, to improve the impact of TMO on EXPERF.

**Implications**

The research findings provide several implications at both the theoretical and practical levels. From a theoretical standpoint, this research enhanced the understanding of the mechanism through which TMO influences EXPERF. Specifically, TMO can enhance supply chain business processes, including efficiency, flexibility, and quality, which subsequently improve a firm’s EXPERF in international markets. This study also highlights the importance of adopting new digital technologies that support supply chain strategies to ensure timely deliveries and customer satisfaction, ultimately enhancing EXPERF.

The second theoretical implication relates to marketing theory. By incorporating perspectives from both marketing and SCM, this study employs KBV theory to demonstrate how integrating diverse disciplines within an organization can improve EXPERF. The research emphasizes the role of SCM in leveraging TMO, for example, in producing innovative products and developing digital marketing strategies within a collaborative supply chain. This allows firms to adapt to changing customer demands and, consequently, elevate their EXPERF in international markets.

From a practical perspective, this study provides valuable insights for companies aiming to improve their EXPERF. The research suggests that firms should allocate resources to technologies that enhance their marketing strategies, particularly within supply chains, to improve EXPERF. A well-structured and efficient supply chain can significantly impact the success of technologically driven marketing efforts in international export markets.

In practice, managers should align their supply chain strategies with their TMO. This involves investing in technologies that bolster supply chain responsiveness, flexibility, collaboration, sustainability, and agility, such as demand forecasting and real-time inventory visibility. Close collaboration with suppliers, distributors, and other partners is also crucial for streamlining the supply chain and effectively meeting customer needs in international markets.

Given the complexity of global supply chains, managers should prioritize risk management, including monitoring geopolitical changes, diversifying suppliers, and implementing contingency plans. Leveraging data from technological marketing initiatives can enhance the supply chain’s customer–supplier approach by offering insights into international customer preferences and purchasing behavior. Regulatory compliance is essential, as any violations could negatively impact EXPERF. Finally, managers should prioritize continuous improvement by monitoring emerging technologies, incorporating best practice, and conducting regular assessments of the supply chain’s performance to achieve successful export outcomes.

**Limitations and future research**

Beyond the findings of this study, there are several limitations that future research should address. First, in this study, a quantitative research method was used. In future research, it would be useful to incorporate a qualitative approach, such as interviews with managers. Second, due to the shortness of time, the research was done in one time period. Future research might examine the research model at different time points and different results may be obtained. Third, this study focused on global firms operating in a wide range of industries but did not focus on a specific industry. Future research could focus on a specific industry, such as the high-tech or pharmaceutical industry. Finally, the research data were collected in several countries across Europe without focusing on a specific country. It is possible that in future research, the research results could be different for each country.

**CONCLUSIONS**

The focal objective of this study is to explore how SCM acts as a mediator between TMO and a firm’s EXPERF. Unlike previous research, which mostly looked at how TMO directly affects EXPERF, this study goes a step further. It shows that SCM is a key factor as a partial mediator that improves EXPERF. Consequently, the empirical findings from this research challenge current thinking by showing how important it is to include SCM in a company’s operational framework. In short, it is not just about using TMO resources; it is also about how SCM is a mechanism that helps managers to boost their firm’s EXPERF and make it more competitive in international markets.

**REFERENCES**

Ab Hamid, M., Sami, W., & Sidek, M. M. (2017). Discriminant validity assessment: Use of Fornell & Larcker criterion versus HTMT criterion. Journal of Physics: Conference Series,

Abdallah, A. B., Rawadiah, O. M., Al-Byati, W., & Alhyari, S. (2021). Supply chain integration and export performance: the mediating role of supply chain performance. *International Journal of Productivity and Performance Management*, *70*(7), 1907-1929.

Achrol, R. S., & Kotler, P. (1999). Marketing in the network economy. *Journal of marketing*, *63*(4\_suppl1), 146-163.

Adam, M., Ibrahim, M., Ikramuddin, I., & Syahputra, H. (2020). The role of digital marketing platforms on supply chain management for customer satisfaction and loyalty in small and medium enterprises (SMEs) at Indonesia. *International Journal of Supply Chain Management*, *9*(3), 1210-1220.

Agrawal, P., & Narain, R. (2018). Digital supply chain management: An Overview. IOP Conference Series: Materials Science and Engineering,

Al-Ghwayeen, W. S., & Abdallah, A. B. (2018). Green supply chain management and export performance: The mediating role of environmental performance. *Journal of Manufacturing Technology Management*.

Amine Belhadi, R. S. M., Sachin S. Kamble. (2023). *Digital Transformation and Industry 4.0 for Sustainable Supply Chain Performance*. Springer. <https://doi.org/10.1007/978-3-031-19710-9>

Andonova, V., & Losada-Otálora, M. (2020). Understanding the interplay between brand and innovation orientation: Evidence from emerging multinationals. *Journal of Business Research*, *119*, 540-552.

Ardito, L., Petruzzelli, A. M., Panniello, U., & Garavelli, A. C. (2018). Towards Industry 4.0: Mapping digital technologies for supply chain management-marketing integration. *Business Process Management Journal*, *25*(2), 323-346.

Arthur Solberg, C., & Olsson, U. H. (2010). Management orientation and export performance: the case of Norwegian ICT companies. *Baltic Journal of Management*, *5*(1), 28-50.

Bandalos, D. L., & Finney, S. J. (2001). Item parceling issues in structural equation modeling. *New developments and techniques in structural equation modeling*, *269*, V296.

Borges, M., Hoppen, N., & Luce, F. B. (2009). Information technology impact on market orientation in e-business. *Journal of Business Research*, *62*(9), 883-890.

Bulmer, M., & Warwick, D. P. (1983). Data collection. *Social research in developing countries: Surveys and censuses in the Third World*, 145-160.

Cachon, G. P., & Netessine, S. (2006). Game theory in supply chain analysis. *Models, methods, and applications for innovative decision making*, 200-233.

Chang, S.-J., Van Witteloostuijn, A., & Eden, L. (2020). Common method variance in international business research. *Research methods in international business*, 385-398.

Cheshmberah, M., Zahedi, M., Hadizadeh, A., & Tofighi, S. (2011). A mathematical model for optimum single-commodity distribution in the network of chain stores: a case study of food industry. *Management Science Letters*, *1*(4), 575-582.

Chetty, S. K., & Hamilton, R. T. (1993). Firm‐level Determinants of Export Performance: AMeta‐analysis. *International marketing review*, *10*(3).

Coffman, D. L., & MacCallum, R. C. (2005). Using parcels to convert path analysis models into latent variable models. *Multivariate behavioral research*, *40*(2), 235-259.

Cooper, C., Pereira, V., Vrontis, D., & Liu, Y. (2023). Extending the resource and knowledge based view: Insights from new contexts of analysis. In (Vol. 156, pp. 113523): Elsevier.

Danneels, E. (2007). The process of technological competence leveraging. *Strategic management journal*, *28*(5), 511-533.

Dash, G., & Paul, J. (2021). CB-SEM vs PLS-SEM methods for research in social sciences and technology forecasting. *Technological Forecasting and Social Change*, *173*, 121092.

Dholakia, N., Zwick, D., & Denegri-Knott, J. (2010). Technology, consumers, and marketing theory. *Marketing Theory*, *1*, 494-511.

Du Toit, D., & Vlok, P.-J. (2014). Supply chain management: A framework of understanding. *South African Journal of Industrial Engineering*, *25*(3), 25-38.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, *18*(1), 39-50.

Graesch, J. P., Hensel-Börner, S., & Henseler, J. (2021). Information technology and marketing: an important partnership for decades. *Industrial Management & Data Systems*, *121*(1), 123-157.

Grant, R., & Phene, A. (2022). The knowledge based view and global strategy: Past impact and future potential. *Global Strategy Journal*, *12*(1), 3-30.

Grant, R. M. (1996). Toward a knowledge‐based theory of the firm. *Strategic management journal*, *17*(S2), 109-122.

Gunasekaran, A., Patel, C., & McGaughey, R. E. (2004). A framework for supply chain performance measurement. *International Journal of Production Economics*, *87*(3), 333-347.

Hair, J. F., Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the academy of marketing science*, *40*(3), 414-433.

Hair Jr, J., Hair Jr, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage publications.

Hair Jr, J. F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: updated guidelines on which method to use. *International Journal of Multivariate Data Analysis*, *1*(2), 107-123.

Hindrawati, G., & Sari, A. N. I. (2022). Organizational Culture through Technology Resources as Antecedents and its Impact on Export Performance of The Furniture Industry.

Hopkins, J. L. (2021). An investigation into emerging industry 4.0 technologies as drivers of supply chain innovation in Australia. *Computers in Industry*, *125*, 103323.

Hortinha, P., Lages, C., & Lages, L. F. (2011). The trade-off between customer and technology orientations: impact on innovation capabilities and export performance. *Journal of International Marketing*, *19*(3), 36-58.

Hou, J., & Chen, C. (2022). Intelligent Logistics Supply Chain Management Based on Internet of Things Technology. 2022 IEEE Asia-Pacific Conference on Image Processing, Electronics and Computers (IPEC),

Hyun, J.-H. (1994). Buyer-supplier relations in the European automobile component industry. *Long Range Planning*, *27*(2), 66-75.

Ikram, M. N., & Siddiqui, D. A. (2019). Effect of Green supply chain management on environmental performance and export performance: A case study of Textile industries in Pakistan. *Ikram, MN and Siddiqui, DA (2019). Effect of Green Supply Chain Management on Environmental Performance and Export Performance: A Case Study of Textile Industries in Pakistan. Social Science and Humanities Journal*, *3*(4), 1006-1019.

Ismail, A. R. (2017). The influence of perceived social media marketing activities on brand loyalty: The mediation effect of brand and value consciousness. *Asia pacific journal of marketing and logistics*.

Jagodič, G., & Milfelner, B. (2022). The role of B2B marketing strategy, ICT B2B marketing support, and service quality in market orientation–Performance relationship: evidence from three European countries. *Cogent Business & Management*, *9*(1), 2128252.

Jara, A. J., Parra, M. C., & Skarmeta, A. F. (2012). Marketing 4.0: A new value added to the Marketing through the Internet of Things. 2012 sixth international conference on innovative mobile and internet services in ubiquitous computing,

Kannan, P. (2017). Digital marketing: A framework, review and research agenda. *International journal of research in marketing*, *34*(1), 22-45.

Kelley, K., Clark, B., Brown, V., & Sitzia, J. (2003). Good practice in the conduct and reporting of survey research. *International Journal for Quality in health care*, *15*(3), 261-266.

Kishton, J. M., & Widaman, K. F. (1994). Unidimensional versus domain representative parceling of questionnaire items: An empirical example. *Educational and psychological measurement*, *54*(3), 757-765.

Kopanaki, E., Karvela, P., & Georgopoulos, N. (2018). From traditional interorganisational systems to cloud-based solutions: The impact on supply chain flexibility. *Journal of Organizational Computing and Electronic Commerce*, *28*(4), 334-353.

Launiala, A. (2009). How much can a KAP survey tell us about people's knowledge, attitudes and practices? Some observations from medical anthropology research on malaria in pregnancy in Malawi. *Anthropology Matters*, *11*(1).

Lazarova, M., & Sapundzhi, F. (2023). Stochastic Modeling with Applications in Supply Chain Management and ICT Systems. *Computation*, *11*(2), 21. <https://doi.org/10.3390/computation11020021>

Levi-Bliech, M., Naveh, G., Pliskin, N., & Fink, L. (2018). Mobile technology and business process performance: The mediating role of collaborative supply–chain capabilities. *Information Systems Management*, *35*(4), 308-329. [https://doi.org/https://doi.org/10.1080/10580530.2018.1503803](https://doi.org/https%3A//doi.org/10.1080/10580530.2018.1503803)

Lichtenthaler, U. (2016). Determinants of absorptive capacity: The value of technology and market orientation for external knowledge acquisition. *Journal of Business & Industrial Marketing*, *31*(5), 600-610.

Lindell, M. K., & Whitney, D. J. (2001). Accounting for common method variance in cross-sectional research designs. *Journal of applied psychology*, *86*(1), 114-121.

Ling-yee, L., & Ogunmokun, G. O. (2001). Effect of export financing resources and supply-chain skills on export competitive advantages: implications for superior export performance. *Journal of World Business*, *36*(3), 260-279.

Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural equation modeling*, *9*(2), 151-173.

Luggen, M. (2004). *Technology and innovation management in new technology-based firms: Introducing the PockeTM concept* ETH Zurich].

Marbun, D. S., Effendi, S., Lubis, H. Z., & Pratama, I. (2020). Role of education management to expediate supply chain management: a case of Indonesian Higher Educational Institutions. *International Journal of Supply Chain Management (IJSCM)*, *9*(1), 89-96.

Masa’deh, R. e., Al-Henzab, J., Tarhini, A., & Obeidat, B. Y. (2018). The associations among market orientation, technology orientation, entrepreneurial orientation and organizational performance. *Benchmarking: An International Journal*, *25*(8), 3117-3142.

Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, N. W., Smith, C. D., & Zacharia, Z. G. (2001). Defining supply chain management. *Journal of Business logistics*, *22*(2), 1-25.

Min, H. (2019). Blockchain technology for enhancing supply chain resilience. *Business Horizons*, *62*(1), 35-45.

Mubarak, M. F., Shaikh, F. A., Mubarik, M., Samo, K. A., & Mastoi, S. (2019). The impact of digital transformation on business performance: A study of Pakistani SMEs. *Engineering technology & applied science research*, *9*(6), 5056-5061.

Pham, H. C., Nguyen, T.-T., Mcdonald, S., & Tran-Kieu, N. Q. (2019). Information sharing in logistics firms: An exploratory study of thevietnamese logistics sector. *The Asian Journal of Shipping and Logistics*, *35*(2), 87-95.

Piercy, N. (1984). The impact of new technology on services marketing. *The Service Industries Journal*, *4*(3), 193-204.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of applied psychology*, *88*(5), 879-903.

Queiroz, M. M., & Telles, R. (2018). Big data analytics in supply chain and logistics: an empirical approach. *The international journal of logistics management*.

Quintana-García, C., & Benavides-Velasco, C. A. (2008). Innovative competence, exploration and exploitation: The influence of technological diversification. *Research policy*, *37*(3), 492-507.

Rao, P. (2002). Greening the supply chain: a new initiative in South East Asia. *International Journal of Operations & Production Management*.

Reaidy, P. J., Lavastre, O., Ageron, B., & Chaze-Magnan, L. (2021). Consumer integration in supply chain management: a taxonomy. Supply Chain Forum: An International Journal,

Rich, N., & Hines, P. (1997). Supply‐chain management and time‐based competition: the role of the supplier association. *International Journal of Physical Distribution & Logistics Management*.

Rosário, A. T., & Dias, J. C. (2022). Industry 4.0 and marketing: towards an integrated future research Agenda. *Journal of Sensor and Actuator Networks*, *11*(3), 30.

Rossi, M., Tuunainen, V. K., & Pesonen, M. (2007). Mobile technology in field customer service: Big improvements with small changes. *Business Process Management Journal*, *13*(6), 853-865.

Sarstedt, M., Ringle, C. M., Henseler, J., & Hair, J. F. (2014). On the emancipation of PLS-SEM: A commentary on Rigdon (2012). *Long Range Planning*, *47*(3), 154-160.

Shoham, A. (1996). Marketing-mix standardization: determinants of export performance. *Journal of global marketing*, *10*(2), 53-73.

Sundararajan, R., Menon, P., & Jayakrishnan, B. (2022). Future of artificial intelligence and machine learning in marketing 4.0. Proceedings of the 7th International Conference on Big Data and Computing,

Takahashi, R. (2017). How can creative industries benefit from blockchain. *Mckinsey [Online]*.

Tseng, P.-H., & Liao, C.-H. (2015). Supply chain integration, information technology, market orientation and firm performance in container shipping firms. *The international journal of logistics management*.

Tsou, H.-T., Chen, J.-S., & Liao, W.-H. (2014). Market and technology orientations for service delivery innovation: the link of innovative competence. *Journal of Business & Industrial Marketing*, *29*(6), 499-513.

Vassileva, B. (2017). Marketing 4.0: How technologies transform marketing organization. *Óbuda university e-Bulletin*, *7*(1), 47.

Walton, S. V., Handfield, R. B., & Melnyk, S. A. (1998). The green supply chain: integrating suppliers into environmental management processes. *International journal of purchasing and materials management*, *34*(1), 2-11.

Wong, K. K.-K. (2013). Partial least squares structural equation modeling (PLS-SEM) techniques using SmartPLS. *Marketing Bulletin*, *24*(1), 1-32.

Zhang, D., Frei, R., Wills, G., Gerding, E., Bayer, S., & Senyo, P. K. (2023). Strategies and practices to reduce the ecological impact of product returns: An environmental sustainability framework for multichannel retail. *Business Strategy and the Environment*.

Zou, S., & Stan, S. (1998). The determinants of export performance: a review of the empirical literature between 1987 and 1997. *International marketing review*, *15*(5), 333-356.

Zou, S., Taylor, C. R., & Osland, G. E. (1998). The EXPERF scale: a cross-national generalized export performance measure. *Journal of International Marketing*, *6*(3), 37-58.