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ORIGINAL PAPER

CONCEPT FOR IDENTIFYING PROBLEMS IN SUPPLY CHAINS IN OMNI-CHANNEL SYSTEMS

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ABSTRACT. **Background:** In a rapidly changing competitive environment and increasing customer expectations, an efficient supply chain is a very important success factor. What should be avoided and what should be considered during planning and supply chain management? Is it possible to apply the same solutions to each business model (B2B/ B2C)? The following article presents the perspective of manufacturing companies. In the current situation there is less and less space for companies operating according to only one model. Each company is considering strategies: low profit in B2B models, which due to greater predictability of demand gives lower risk of production planning and omni-channel in B2C models, which by definition are more profitable, but are associated with a higher risk of demand change. The article presents problems and challenges during supply chain management in manufacturing companies that use both business models in the era of e-commerce market.
Methods: Based on the available literature, the problems of supply chain management in B2B and B2C relations are presented. The frequency of their occurrence was surveyed and the level of risk of negative impact on the company and its environment was presented.
Results: The survey identified the challenges and problems that companies face when managing their supply chains, and those that pose the highest and lowest risks.
Conclusions: This article presents the concept of identification of problems and challenges faced by manufacturing companies and models of actions to be applied in order to minimize their effects. The article is two-dimensional, showing a perspective for simple supply chains (B2B) and omni-channel chains (B2C).

Key words: SCM problems, SCM challenges, SCM production companies, B2B, B2C, DRP, Supply chain tailored to the needs of omni-channel, e-commerce.

MAIN ISSUES DURING MANAGING SUPPLY CHINS FROM B2B PERSPECTIVE

Functional instead of process approach

The Chain is generally defined as a combined sequence of organizational units composing a sequence. The supply chain has traditionally been divided into planning, procurement, logistics and services, with individual managers focusing on extrusion of maximum value in their own departments. Initially, this approach was impressive in terms of improving overall financial performance, but today, when it is much more difficult, companies should stop treating the supply chain as a simple sequence and start to see it as a multifunctional process and organizational structure. The difference seems small, but for many companies it means very serious challenges. Supply chain managers now go far beyond their internal activities and relationships to deal with B2B and even B2C processes and interactions. This of course requires the ability to deal with external partners.

The new approach includes listening to customers' voices and integrating marketing processes and consumer research into the

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supply chain. This change in approach not only squeezes more out of the internal supply chain, but also creates a collaborative structure that generates new value in the systems between the different "silos", while bearing in mind the "total cost of the ownership structure".

Another serious shortcoming is that you follow a well-established path that has its advantages: employees are confident in comfort and their leaders do not have to change their market strategies. The problem is that this attitude can block extensive transformation processes that require fundamental changes in the interactions between the supply chain and other business functions of the company, and can also prevent the chain from adapting to the optimal use of closer interactions with consumers. For example, we would achieve little if we did not manage to move away from a centralized push system based on the concept of supply and towards a decentralized pull system based on point-of-sale signals. Forecasts of processes aimed at minimizing missed deliveries from factories or warehouses are not the same as forecasts of supply chain processes, but using data from points of sale. Many companies measure their success not with the number of units of goods they produce, but, like our retailers, with the number of units sold.

Insufficient transparency of data

Each supply chain works with a certain inertia, not faster than the slowest of its devices or processes. Effective supply chain management practitioners are constantly looking for a balance between the effort required to gather information and the benefits of being able to respond in real time. This approach works well when, for example, we collect inventory information for our warehouse management program from suppliers via business partners. In this case, it is worth receiving information daily, but it is more convenient to update it weekly because the response time of transport networks is typically three days (two for transport and one for collection and packaging of goods).

Observation shows that ERP systems, which collect data about the company, give a certain picture of the (transactional) activities of the company's client. However, many users of such systems do not take the necessary further action, so they have a lot of data "in stock" but little knowledge. All information about customer transactions, production plans and logistics solutions should be available almost immediately. The resulting data can then be analyzed with supply chain planning tools and transformed into useful knowledge. Too many companies have made a costly mistake assuming that the right ERP package from the right supplier will solve all problems immediately [Kot et al. 2011].

Real-time mass data does not necessarily have to be immediately useful. It is important to determine where in our extensive supply chain such a data resource could really be useful in the company.

The bullwhip effect

Due to the distributed distribution structure of several warehouses, there are many connections between the market and the manufacturer that mediate the exchange of information. This fact, together with the variability of demand, reduces the efficiency of the information flow in the supply chain and leads to the so-called bullwhip effect. It was Jay Forrester who, in his 1958 investigation, found that the accumulation of surplus stocks in the early stages of the supply chain was the result of the gradual distortion and amplification of information about small changes in demand. The relatively small fluctuation in demand reported by end-users increases significantly as demand is reported in the supply chain, i.e. to the manufacturer and further to the suppliers. Demand data is overestimated (distorted) at each subsequent level of the distribution channel. This leads to excessive investment in equities to meet uncertain and diversified demand. Consequently, stocks at the upstream end of the supply chain are actually larger than the fluctuations in demand at the downstream end of the supply chain require [Costantino et al. 2011].

Similarly, procurement policy depends on companies' internal procedures. As a rule, large consignments of goods are regularly ordered for the following reasons, among others:

- high cost and high labor intensity of frequent order processing,
- a desire to save on transport costs (full vehicle transport),
- the willingness to take advantage of discounts granted when ordering large quantities,
- the size of the set logistical minima dictated by the suppliers,
- activation of sales related to the willingness to implement the assumed sales plans (increased order placement at the end of the settlement period).

Technology is not the key to everything

IT solutions must be implemented in the most complex supply chain processes. Someone has noticed that every business event is an IT event. This cannot be denied, but it is important to know that while a robust IT platform is undoubtedly necessary, it is not the only prerequisite for the success of a project.

We easily succumb to the charm of IT solutions and forget that the real key to the success of the transformation process is the transformation of business processes supported by the implemented technology. We can also easily forget that the transformation into small quantities will not take place without the links between the different "silos" in the supply chain. The best recipe for success is to create a solid technology platform that is available to the right people, who can implement and adapt business processes that enable the implementation of the business strategy. However, the worst solution is to remember the technology platform itself.

Choosing appropriate indicators

Key performance indicators are financial and non-financial indicators that are used as measures to measure the achievement of an organization's objectives. They support the achievement of the company's operational and strategic objectives. They are important for building a results-oriented organizational culture, as they provide employees with objective feedback on their work, costs and quality.

KPIs are also an instrument of management control. They enable fast decision making, prioritize activities, react early to problems and support processes for continuous improvement and effective use of the organization's resources.

It is very important to select the indicators that illustrate the functioning of the supply chain. Too many indicators can lead to individual targets for the indicators that exclude the achievement of the other targets. Too few indicators distort the perception of supply chain efficiency [Milczarek 2017]. In this case, the Balanced Score Card (BSC) method can be used.

Trade off in supply chain

Links between logistics and production systems often lead to "cost conflicts", so improvements in one part of the system can lead to deterioration in another part of the system. However, if this increases the benefits of the entire system, it is beneficial. On the cost side, this means that reducing the operating costs of one element of a system can lead to an increase in the costs of another element.

These relationships are often associated with different types of inventories, due to the fact that inventories are located at the meeting point of different elements of the systems and that cost conflicts occur exactly at the meeting points of different areas of business, if not just.

Of course, the total costs are somewhat different in terms of quality. It should be noted that, in addition to the costs of ensuring an adequate level of quality (e.g. prevention and control costs), there are also costs of poor quality (internal - need for corrections, waste of materials, time, etc.) and external - related to complaints, loss of customers, etc.).

Similarly, the cost of logistic support - the total cost of logistic support - is both the cost of ensuring an adequate level of logistic service (transport costs, stockpiling of finished goods, etc.) and the cost of not having an adequate level of service. For the supplier it is the loss of a customer, for the customer it is the

cost of maintaining safety stocks in the event of delivery delays. The costs associated with a lack of quality increase with the number of errors. The relationship between the cost of quality assurance and the lack of quality is often illustrated in Figure 5 and is therefore also a consideration. Therefore, in the past it was considered uneconomical to strive for 100% quality (implementation quality) because the associated costs (e.g. control costs) would eventually outweigh the benefits. Today, however, the idea of zero defects is increasingly being pursued and it is suspected that quality deficiency costs too much. These costs can decrease despite the increase in quality. It will be a trade-up relationship. The same can happen with logistics customer service - there may be situations where customer service increases and costs decrease at the same time. Both the quality costs and the costs for logistic customer service can therefore be determined not only by the trade-off, but also by the trade-up principle.

Risk sharing

A decisive factor for the success of the supply chain is the exchange of information between the different parts of the chain. The exchange of information on market needs provides the opportunity to respond to changing market needs. The fact that customers are confronted with the manufacturer's competitors can be used to use this knowledge to change their supply chains.

At the same time, participation in the supply chain requires risk sharing. This risk sharing diversifies the costs of implementing new solutions and enables shared responsibility and benefits from the measures taken.

However, inadequate risk sharing or incorrect risk placement can destabilize the chain. Cells that feel that the risk is greater for them than for the rest of the chain can form sub-alliances.

Implementation of changes

Change processes are a daily reality in every organization. However, effective change management is no longer so widespread [Wieczerniak et al. 2017]. Change processes often lead to unintended results: Inertia instead of forward movement. Without the ability to anticipate and prepare, companies fall into traps that are normally predictable and avoidable. Organizations can be confronted with the following common traps:

- Insufficient preparation time
- Incorrect communication lines
- Insufficient support from change agents
- Wrong style of crisis management
- Warnings without further delay
- Profits matters, not people.

Disregard for the human factor

Often employees cannot adapt to a new business model or use new tools and processes in the old way. The "good, because that's how we always did it" attitude is the main reason why many changes in the supply chain have failed.

Traditional approaches to change management rely on a wide range of training and provide individuals with the new skills they need to perform their new roles. These are necessary, but not enough. The traditional approach should also take into account the fact that not every employee can be properly trained and not everyone can learn the skills his or her superiors just wanted. There are people who are unable to think analytically, or who lack the technical knowledge to master new ways of doing things. Such employees often feel very uncomfortable at work, and their incompetence irritates their superiors. If such tensions are not quickly reduced, the resulting situation could seriously affect the transition process.

Workers can be divided into four categories: first, "guns" who love change, who catch it in flight and want it to happen frequently, then "opportunists" who accept change when they give them something, "marauders" who are waiting very far advanced and only then do they start working in it, and "others" who either don't understand it or don't want to understand it and want to fight it off to the end. It is extremely important to know who will contribute to our supply

chain transformation and who will be affected. This will help us to divide roles correctly and form effective teams, which will increase our chances of success.

Incorrect perception of concern for one's own interests

During the mass production period, many companies were themselves involved in production and believed that this would help them control their own destiny. In some places, there is still a belief that virtual companies, or those that have decided to outsource activities that are not part of their core business, are giving up some of their power over themselves. Meanwhile, the entire modern net-based economy has the results it needs because it is about maximizing the basic skills of our business partners and focusing primarily on what is best for us.

Not all companies can become virtual companies, and not all companies should try. Even a comprehensive supply chain management star like Cisco Systems does not want to give up strategic control and planning of its operations or tactical management of key elements of the supply chain. In the future, however, the effectiveness of the supply chain is expected to depend primarily on the degree of collaboration between companies that form large value chains.

MAIN ISSUES DURING MANAGING SUPPLY CHINS FROM B2C PERSPECTIVE

With omni-channel logistics, companies can adapt the purchasing and delivery of their products to the needs of modern customers. Consumer expectations are evolving, product searches should be ensured both in the traditional way in the shop and on the Internet. With a finger or a few mouse clicks, the products will be purchased and delivered within 24 hours [Brynjolfsson et al. 2013]. Expecting immediate customer satisfaction means that companies need to develop their supply chain to minimize costs while providing the same level of customer service. A omni-channel logistics system is based on these assumptions.

The "Omni-channel Logistics" strategy aims to synchronize the work of the various logistics departments in all distribution channels. The primary objective is to meet the needs of consumers. Retailers, manufacturers and wholesalers develop complex, multi-level logistics solutions. These solutions are designed to ensure that the supply chain at the lowest cost meets the customer's needs at the assumed service level. For example, it is more economical to deliver a product from a local retail store to a customer than to deliver it individually to multiple customers from a distribution centre tens of kilometres away.

Omni-channel logistics has many applications:

- Internet order is delivered directly to the customer home.
- The online ordered product is sent to the shop, the consumer receives it in the shop (thanks to which the customer visits the shop and gets acquainted with its offer).
- To purchase an item that is not currently available in the warehouse of this store, to deliver the item at a later date to the selected store or directly to the consumer's home.
- Online ordering via eRetail and delivery to the buyer's home via the eRetailer distribution channels or to the seller.
- Order the product via the online shop and ship the order directly to the consumer from the manufacturer of the product.

Omni-channel Logistics allows to synchronize the flow of products in all distribution channels but poses unique challenges [Chopra and Meindl 2007]. If they are overlooked, they can lead to increased costs and weakened brand competitiveness. In this article, a list of the 9 most important challenges facing the omni-channel system has been compiled.

Lack of inventory visibility and metrics structure

In omni-channel logistics, it's all about inventory consistency and knowing where your

inventory is, whether it's a distribution centre or a retail outlet. Companies can't promise their customers the next day's delivery and can't execute it. The place where there is a stock in omni-channel logistics is a particular challenge during the Christmas shopping season. To meet this challenge, companies need to develop an efficient ordering process using a coordinated warehouse management system (WMS).

Companies that make proper use of the omni-channel system will use the transparency of inventories to accurately forecast demand and plan their product flow activities. Companies that make maximum use of omni-channel can sell orders online without physically taking over the product [Piotrowicz and Cuthbertson 2014]. Electronic order management systems are synchronized so that online orders run directly from the manufacturer and are handled by an external partner in the company's supply chain.

When it comes to inventory transparency, the statement "You can't manage what you don't measure" applies. It is important to establish performance indicators associated with inventory, such as the cost of inventory, the percentage of perfect order and the percentage of orders executed from the ideal storage location. For indicators to be important, they need to be consistent with financial and strategic objectives and with the level of customer service. In an omni-channel supply chain, indicators must show how efficiently products flow through distribution networks to multiple retailers, retailers and wholesalers, and consumers.

Poor transparency of stocks in transport

Like large companies and start-ups, there is usually a relatively weak inventory mix in transport. It has led to an increased demand for cargo visibility solutions in real time. Omni-channel logistics solutions provide visibility into shipments and trucks, and also into orders and warehouse units [Tetteh and Xu 2014]. These solutions also include optimization and collaboration functions that improve the exchange of data and information between links in the supply chain. The best solutions began to take advantage of machine learning opportunities and a wider range of data sources including traffic, location, weather to enable forecasting and more accurate estimation of arrival times.

Segmented supply chain processes

When different supply chain processes in a company do not work together, customer satisfaction cannot be guaranteed consistently. Larger companies usually have many private warehouses and distribution centres, managed by different internal and external operators, operating on different systems [Tetteh and Xu 2014]. This is why they use different tactics to ensure a smooth supply chain. The key to solving this segmentation of the supply chain is to consolidate these processes instead of allowing them to work in silos.

Unreliable order fulfillment processes

If a company tells its customers that delivery should be the same day or the next day, it must keep that promise. Unreliable order processing can lead to delays in shipping, which can discourage customers from doing business with the company in the future. To ensure a smooth order fulfillment process, you can use the right technology to anticipate future delays in handling or shipping.

Selecting the right transport

Delivery of a product from a distribution centre or a stationary store to a customer's front door can be done in many ways. The challenge for supply chain managers is to find the most efficient transport solution that satisfies customers without increasing product costs [Kuźmicz 2015]. Choosing the right shipping channel for the customer is essential for omni-channel logistics.

Return logistics

The return procedure for each product should be as efficient as for the delivery of the product. In an all-channel system, customers expect returns to be possible in store, by mail or courier. Companies that do not offer omni-channel returns will largely be unable to encourage customers to make further

transactions. Implementing a robust return logistics infrastructure is essential for good customer service in omni-channel logistics.

Manual processes

The main sources of inventory imbalances between links in the supply chain are the continuous use of manual processes for recording inventory data. Implementation of the WMS system with the use of Wi-Fi network and scanning of bar codes and 2D codes is the first step. The next step in order to automate stock counting is the use of RFID tags and drone systems. This automation allows you to compare results, detect discrepancies and create a more accurate picture of inventory levels.

Overlooked Physical Transformation

Digital transformation of analysis and technology companies is the most popular, but companies need to be careful not to overlook the physical transformation. The model of moving trucks with products from distribution centers to stores is outdated. Companies need to update their distribution network and management processes to survive in this new market where inventory reduction and speed are paramount. Leaders are testing new sales strategies to become more efficient and better meet customer expectations for faster delivery.

Implementing the 3PL strategy

The success of 3PL is an operational manager, strategic advisor and IT supplier in one. It is particularly valuable, with optimized inventory and implementation of all channels. The key competences of 3PL in the implementation of tasks is the selection of parameters that should be measured and that can help companies to fill the gap in performance.

Omni-channel logistics aims to provide consumers with shopping in a convenient distribution channel. This experience can only be achieved if companies use their e-commerce functions to identify the reality of both a landline store and a network of distribution centres. The optimal 3PL partner uses its knowledge and experience in the supply chain, as well as the diverse capabilities of the WMS and integration strategies to address the challenges described above [Kuźmicz 2015].

THE SURVEY "MISTAKES IN SC MANAGEMENT"

During the study, the following questionnaire (table 1) was sent to be filled in, where:

- In column 3 you should assign whether the problem occurs in B2B or B2C.
- In column 4, specify the level of occurrence by range:
  - 3 - Low probability
  - 9 – Likely
  - 21 - Already occurred
  - 30 - Almost certain or certain

- In columns 5, 6, 7 specify the impact level by range:
  - 1 - Minor
  - 3 - Moderate
  - 7 - Major
  - 10 - Critical

The risk level is calculated automatically as the product of column 4 and the sum of columns 5, 6 and 7.

Below is a gradation of risk levels for survey results:

- 0 – 81 points - Small risk
- 82 – 189 points - Moderate
- 190 – 441 points- Big
- More than 442 points - Critical

The survey performed in 2018 shown the most frequent issues which appears during managing supply chain. The issues in survey was split by place of appearance in B2B or B2C. Responders replayed where the mistake appears according their own experience. There was 65 middle and senior managers participating the research, thanks to this data was collected and the answers were analyzed. The results of the survey are presented in Table 2.

Table 1. Questionnaire model for the survey of "Mistakes in SC management"

	Mistakes in SC management	B2B/ B2C	Risk analyse				
			Appearance	Influence on customer	Influence on environment	Influence on company	Risk
1	Functional instead of process approach						0
2	Insufficient transparency of data						0
3	The bullwhip effect						0
4	Technology is not the key to everything						0
5	Choosing appropriate indicators						0
6	Trade off in supply chain						0
7	Risk sharing						0
8	Implementation of changes						0
9	Disregard for the human factor						0
10	Incorrect perception of concern for one's own interests						0
11	Lack of inventory visibility and metrics structure						0
12	Poor transparency of stocks in transport						0
13	Segmented supply chain processes						0
14	Unreliable order fulfillment processes						0
15	Selecting the right transport						0
16	Return logistics						0
17	Manual processes						0
18	Overlooking physical transformation						0
19	Implementing 3PL strategy						0

Source: the authors' own work

Table 2. Results of the survey "Mistakes in SC management"

Mistakes in SC management	**B2B**	**B2C**	**Risk**
Functional instead of process approach	54%	46%	153
Insufficient transparency of data	52%	48%	420
The bullwhip effect	35%	65%	243
Technology is not the key to everything	45%	55%	189
Choosing appropriate indicators	56%	44%	330
Trade off in supply chain	63%	37%	189
Risk sharing	59%	41%	180
Implementation of changes	45%	55%	504
Disregard for the human factor	49%	51%	315
Incorrect perception of concern for one's own interests	58%	42%	153
Lack of inventory visibility and metrics structure	23%	77%	420
Poor transparency of stocks in transport	10%	90%	180
Segmented supply chain processes	3%	97%	153
Unreliable order fulfillment processes	57%	43%	315
Selecting the right transport	35%	65%	504
Return logistics	45%	55%	180
Manual processes	52%	48%	315
Overlooking physical transformation	21%	79%	315
Implementing 3PL strategy	45%	55%	330

Source: the authors' own elaboration based on the results of the survey research conducted on 2018

In the table the risk is calculated as a the multiplication of the risk of occurrence and the level of influence on the supply chain and consumers.

It was observed as a result of the survey that the split assumed by the author, concluded on the basis of available literature, corresponds to a large extent with the feelings of managers. Seven out of ten problems assumed to occur mainly in B2B relations confirmed their occurrence in the survey. The main problem identified by the respondents is Trade off in supply chain, which affects nearly 2/3 of managers. The second most frequent occurrence in the B2B model is Risk sharing, however, both errors carry one of the smallest risks in supply chain management.

In the B2C model, the most common errors are Segmented supply chain process and Poor visibility into inventory in transit. Both errors, as in the case of the B2B model, are associated with low risk of occurrence. The third most frequent occurrence is Overlooking physical transformation. In this case, the risk of

occurrence and the impact on the supply chain is at a medium level.

It is worth noting that most of the errors presented in the literature affect both B2B and B2C, and the biggest impact on the supply chain has Implementation of changes, Insufficient transparency of data and finding the right way to deliver goods to customer.

CONCLUSION

The advantage of this article is an innovative approach to systematization of problems. Most of the problems affecting the management of supply chains in both models of cooperation are presented. After analysing the available literature and conducting research in the field of senior and middle managers, the frequency of the problem occurrence and its impact on the functioning of supply chains were determined.

The Omni-channel system is much more vulnerable to a lack of information on stock levels and individual logistics units during transit. In addition, it is exposed to interruptions in the cooperation of individual channels, which until now operated separately.

To sum up, the free flow of products, which is expected by customers, is a big challenge for the organization and involves the physical integration of conventional distribution channels as well as the IT tracking of individual logistics units.

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KONCEPCJA INDETYFIKOWANIA PROBLEMÓW W ŁANCUCHU DOSTAW W SYSTEMACH OMNI-CHANNEL

STRESZCZENIE. **Wstęp:** W szybko zmieniającym się konkurencyjnym otoczeniu na tle rosnących oczekiwaniach klientów, bardzo ważnym czynnikiem sukcesu jest sprawny łańcuch dostaw. Czego należy unikać i co należy wziąć pod uwagę podczas planowania i zarządzania łańcuchem dostaw? Czy możliwe jest zastosowanie tych samych rozwiązań do każdego modelu biznesowego (B2B/ B2C)? Poniższy artykuł przedstawia perspektywę firm produkcyjnych. W obecnej sytuacji jest coraz mniej miejsca dla firm działających według tylko jednego modelu. Każda firma rozważa strategie: niski zysk w modelach B2B, który ze względu na większą przewidywalność popytu daje mniejsze ryzyko planowania produkcji oraz system multi-kanałowy w modelach B2C, które z definicji są bardziej opłacalne, ale wiążą się z wyższym ryzykiem zmiany popytu. W artykule przedstawiono problemy i wyzwania związane z zarządzaniem łańcuchem dostaw w firmach produkcyjnych, które wykorzystują oba modele biznesowe w dobie rynku e-commerce.
Metody: Na podstawie dostępnej literatury przedstawiono problemy zarządzania łańcuchem dostaw w relacjach B2B i B2C. Zbadano częstotliwość ich występowania oraz przedstawiono poziom negatywnego wpływu na firmę i jej otoczenie. Badanie przeprowadzono metodą ankietową na próbce 65 managerów wyższego i średniego szczebla z działów zarządzania łańcuchami dostaw w polskich przedsiębiorstwach produkcyjnych.
Wyniki: W badaniu zidentyfikowano wyzwania i problemy, przed którymi stoją firmy zarządzające swoimi łańcuchami dostaw. Przedstawia, które problemy wykazują najwyższy i najniższy poziom ryzyka.
Wnioski: W artykule przedstawiono koncepcję identyfikacji problemów i wyzwań stojących przed firmami produkcyjnymi. Dwuwymiarowość artykułu pozwala zademonstrować perspektywę prostych łańcuchów dostaw (B2B) i łańcuchów wielokanałowych (B2C).

Słowa kluczowe: SCM problemy, SCM wyzwania, przedsiębiorstwa produkcyjne, B2B, B2C, DRP, omni-channel, e-commerce

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