SUPPLY-CHAIN FUNCTIONAL COOPERATION —
A CONSTRUCT DELINEATION

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ABSTRACT

This paper delineates the construct, interorganizational cooperation, within the context of supply-chain management. Because supply-chain management operates, to a large extent, at the functional level, cooperation is viewed as cross-functional relationships that cross organizational boundaries. Supply-chain functional cooperation is defined along two main dimensions: cooperative behavior and cooperative sentiments, each consisting of different components.
INTRODUCTION

An increasingly popular form of interorganizational cooperation is the formation and management of supply chains, which often comprise vertical relationships among several organizations along the value-added chain from raw-material supply to end-product distribution and use. The growing interest in interorganizational cooperation in supply chains has motivated researchers to study performance outcomes as well as circumstances under which such interorganizational cooperation is preferable to alternative governance forms (e.g., market-based or vertically integrated transactions). Academics have also invested efforts in the identification of factors that foster cooperation among companies (e.g., Wilson, 1995).

However, much of this laborious work may be in vain as long as the construct of interorganizational cooperation remains an ambiguous one. In fact, few studies have focused explicitly on interorganizational cooperation (Anderson, Håkansson and Johanson, 1994). Although a multitude of behavioral constructs—such as coordination, collaboration, trust, power, dependence, commitment, communication, satisfaction, social bonding, and adaptation—have been used in studies of interorganizational cooperation they are often utilized in contradictory ways. “Commitment,” for example, is used by some as an antecedent for the formation of cooperative relationships (e.g., Williamson, 1983), while others suggest that increased commitment is an outcome of successful cooperation (e.g., Robicheaux and Coleman, 1994). Still others, consider commitment a characteristic of cooperative interorganizational relationships (e.g., Dwyer, et al, 1987).

We argue that supply-chain researchers need to reach some degree of convergence regarding how interorganizational cooperation is defined before future research on its antecedents and consequences can contribute effectively to the cumulative understanding of this area of inquiry. Only then can the research findings be viewed as comparable across different contexts and industries. The purpose of this paper is to develop a working definition of interorganizational cooperation as it applies to supply-chain
management. Interorganizational cooperation in supply chains operates mainly at the functional level because supply chains reap benefits by establishing interfunctional processes and structures that cross organizational boundaries (Battaglia and Tyndall, 1991). Therefore, it would appear that much responsibility for the implementation of supply-chain management rests on the shoulders of functional managers, and that a study of interorganizational cooperation in supply chains ought to use a functional level of analysis. Thus, our unit of analysis becomes those interfunctional relationships that cross organizational borders in supply chains. For example, the marketing area of a seller often needs to cooperate closely with the purchasing area of the buyer. Before we investigate our focal construct, *supply-chain functional cooperation* (SCFC), we present a conceptual model that reflects both determinants and consequences of SCFC, and introduces a set of moderating factors.

**A SUPPLY-CHAIN FUNCTIONAL COOPERATION MODEL**

![Figure 1 - A supply-chain functional cooperation model](image-url)
Figure 1 presents a conceptual framework using functional-level cooperation across organizational boundaries, or SCFC, as its focal construct. The conceptual framework addresses the following set of research questions: (1) what are the determinants of supply-chain functional cooperation? (2) how does supply-chain functional cooperation affect supply-chain performance? and (3) what factors moderate the relationship between supply-chain functional cooperation and supply-chain performance? These questions serve as the outline for the remainder of this section of the paper.

**Determinants of supply-chain functional cooperation**

In the identification of factors that affect the degree of SCFC, it is natural to start by examining the different structural and process characteristics of these interfunctional relationships that cross supply-chain organizational boundaries. Relevant structural factors are participation, decentralization, and enabling formalization. Based on the literature (e.g., Adler and Borys, 1996; Dwyer and Oh, 1988) we posit that these factors will positively contribute to more cooperative relationships between functional areas of adjacent supply-chain partners:

- **Participation** is the degree to which supply-chain partners provide input to each others’ decision-making processes, including idea generation, decision-making involvement, and goal formulation (cf. Dwyer and Oh, 1988). One benefit of participative planning and decision making is that it provides a common frame of reference that enables supply-chain partners to adapt quickly to new circumstances (Noordewier, John and Nevin, 1990). Participation can also facilitate a concerted response toward mutual goals as it clarifies major responsibilities (Guolla, 1992).

- **Decentralization** refers to the degree to which supply-chain partners share the power to make and implement decisions (Dwyer and Oh, 1988). Alter and Hage (1993, p. 79) argue that interorganizational relationships can be self-regulating through the use

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1 Because we believe that these factors can vary independently of each other, we do not treat them jointly as indicators of some common underlying construct such as degree of bureaucracy (Adler and Borys, 1996).
of decentralized decision-making structures. Furthermore, the more supply-chain partners feel they can influence the nature of their relationship, the more they will be committed toward strengthening the relationship.

- **Enabling formalization** is defined as the degree to which rules, procedures, and instructions support supply-chain partners in improving their relationship (Adler and Borys, 1996). Enabling formalization is designed to support employees in the performance of their tasks and appears to complement commitment. This is in contrast to coercive formalization which is more typically used to force effort and compliance from employees. Enabling formalization helps supply-chain partners in several ways. First, formal procedures become the "organizational memory" (Argyris and Schon, 1978) that captures lessons learned from experience and codifies best-practice routines. An organizational memory facilitates learning since you cannot improve an unstandardized process (Adler, 1993). Second, employees will find their work more rewarding if they are better able to perform their tasks and be of value to their exchange partners. Third, formal procedures increase organizational commitment by reducing role ambiguity and role conflict (Michaels, Cron, et al., 1988).

In addition to structural characteristics, we also consider as SCFC determinants a set of interfunctional processes ranging from the incentive system, to electronically-mediated exchange, and face-to-face interaction:

- Building on Heide's work (1994), we argue that an *incentive system* can be designed to reward more cooperative supply-chain relationships. If an incentive system is perceived to jointly reward cooperative behavior over the long term, parties will be more inclined to accept temporary "losses," in anticipation of longer-term returns resulting from the relationship.

- *Electronically-mediated exchange* refers to the intensity with which functions in adjacent supply-chain organizations communicate through electronic media, such as
telephone, voice mail, telefax, electronic mail, and EDI systems. Nohria and Eccles (1992) suggest that electronically-mediated exchange contributes to increased cooperation as it empowers front-line workers with information; enables direct communication between individuals at lower levels in the organization across time and space; and blurs organizational boundaries. In a supply-chain context, integrated information flows often absorb uncertainty (Allaire and Firsio, 1989) as well as reduce system volatility which can be induced by delayed information (Towill, Naim and Wikner, 1992). The common theme is that electronically-mediated exchange supports interorganizational cooperation by facilitating dissemination of information at all organizational levels.

- While Nohria and Eccles (1992) recognize the potential benefits from electronically-mediated exchange, they emphasize also that face-to-face interaction is a much more effective mode of communication for resolving uncertainties, ambiguities, and risk. Because we expect supply-chain managers to encounter both well-defined situations conducive to electronically-mediated exchange and equivocal circumstances calling for face-to-face interaction, we include both these communication modes as SCFC determinants. The use of “rich” communication media, such as face-to-face interaction, leaves more opportunity for feedback that allows the receiver of a message to immediately ask the sender to clarify any ambiguities.

**Performance consequences of supply-chain functional cooperation**

With respect to the performance consequences of SCFC, we posit that SCFC will positively contribute to supply-chain performance. We quickly acknowledge, however, that supply-chain performance can be construed broadly and can encompass a wide range of outcomes. We will limit our presentation to the following measures of supply-chain performance: total costs; sales volume; relationship satisfaction; and, expectation of relationship continuation:
• **Total costs.** Larson and Lusch (1992) suggest that the supply-chain performance can be determined by measuring the total procurement costs incurred by a buyer. Building on work in integrated logistics management and Just-in-Time processes, they conclude that “functional integration” will decrease total costs. Similarly, Landeros and Monczka (1989) suggest that cooperative buyer-seller relationships strive to increase quality and productivity, while reducing overall costs. Furthermore, synergies achieved through continual adaptations by supply-chain partners is proposed to be a driving force behind total cost reductions (Håkansson and Johanson, 1993, p. 17).

• **Sales volume.** Mohr and Spekman (1994) suggest that the sales volume flowing through a relationship is an indicator of relationship performance because it is of value to both parties. We propose that cooperation between supply-chain partners will increase the sales volume flowing through a supply chain by both preserving current exchanges, and by leveraging new business opportunities.

• **Relationship satisfaction** is the partners’ perception “that their collective effort is achieving what it was intended to achieve, that it works smoothly, and that it is reasonably productive” (Alter and Hage, 1993, pp. 197-198). Several authors support the notion that increased interorganizational cooperation enhances relationship satisfaction (e.g., Anderson and Narus, 1990; Mohr and Spekman, 1994).

• **Expectation of relationship continuation** is defined as the partners’ perception that they both expect the relationship to continue into the future (Heide and John, 1990, p. 29). Expectation of relationship continuation has been found to be closely related to satisfaction, as both constructs are positively influenced by the achievement of mutual goals through coordinated efforts (Osgood, 1968).

**Moderating factors**

Finally, our conceptual framework considers some situational and environmental circumstances that affect the strength of the relationship between functional cooperation and supply-chain performance. We argued previously that SCFC is likely to contribute
to increased supply-chain performance. However, this may not always hold true. Some interorganizational transactions may be better governed through traditional market mechanisms involving minimal degrees of cooperation. We present three moderating factors that, we believe, determine the strength of the relationship between SCFC and supply-chain performance. These factors are transaction-related risk; relationship dependence; and, environmental uncertainty:

- **Transaction-related risk.** Drawing on Johnston and Lewin (1996)\(^2\) we define transaction-related risk in terms of a transaction's (1) importance, (2) complexity, (3) outcome uncertainty, and (4) time pressure experienced by either the buyer or the seller. Transaction-related risk can be derived from pure situational characteristics of the relevant transaction, such as physical attributes or the role that the product plays for the organization. For example, a typical commodity product is less complex and critical to a buyer than a systems product. Through functional cooperation, a buyer and seller can reduce uncertainties associated with transactions. Therefore, we argue that a higher degree of transaction-related risk calls for a higher degree of SCFC.

- **Relationship dependence** captures the extent of one's reliance on a particular relationship and we argue that this can affect the value of SCFC. Social exchange theory suggests that a party who is satisfied with its current exchange partner, relative to its next best available alternative, is more dependent on that party and is motivated to invest energy in maintaining the relationship over time (e.g., Anderson and Narus, 1990). In markets where the trend is toward single sourcing and the purchase of "systems" rather than individual components, dependence on current relationships is likely to increase because of the paucity of available alternative partners (Hosford, 1994). In order for SCFC to be truly valuable, we posit that both supply-chain partners need to be dependent upon the relationship. Therefore, a better term for this moderating factor might be relationship interdependence.

\(^2\) They identified the four indicators of transaction-related risk from the perspective of the buyer.
• Environmenta... uncertain... the p... a high degree of environmental uncertainty will find SCFC more valuable. Since SCFC engender greater cross-functional cooperation, supply-chain partners learn more about the other’s task environment thereby reducing the level of uncertainty (Osland and Yaprak, 1995). Furthermore, high environmental uncertainty forces the parties to flexibly adapt to unforeseen changes. This adaptive capability is facilitated through a high degree of cooperation.

DELINEATION OF SUPPLY-CHAIN FUNCTIONAL COOPERATION

Our previous discussion was intended to present an overview of the SCFC construct. However, before future studies of SCFC determinants and consequences can be productive, there must be a singular definition of SCFC. This section will start to delineate the construct of supply-chain functional cooperation.

SCFC is different from the choice of governance structure

One way to narrow the domain of SCFC is to specify what it is not. SCFC is different from the choice of governance structure. Williamson (1975) discusses different governance structures ranging from markets to hierarchies and long-term cooperative agreements. Where perfect market conditions prevail, transactions are carried out with minimal interaction among organizations, and companies have minimal commitment to doing business with an exchange partner. At the opposite extreme are hierarchies which imply that one company has internalized these exchanges through vertical integration. Long-term cooperative agreements are intermediate forms of governance in which companies enter long-term cooperative agreements but remain independent (Webster, 1992).
We are not saying that SCFC necessarily is independent from the choice of governance form. After all, the degree of functional cooperation in a supply-chain partnership is unlikely to be high if the companies involved rely on pure market-based mechanisms for buying and selling. Conversely, two companies that have consummated a long-term cooperative agreement are more likely to also achieve a high level of functional cooperation.

While certain governance forms may facilitate enhanced functional-level cooperation and the resultant synergies, implementation still remains to be done. For instance, two organizations involved in a long-term cooperative agreement will not automatically increase the degree of functional cooperation if companies decide to merge. Still, it is often assumed that ownership integration by itself will result in synergies that stem from enhanced levels of cooperation. Picturing governance forms along a continuum with vertical integration as the high extreme end implies that the internalization of transactions under one ownership umbrella is a necessary condition for achieving a very high degree of functional-level cooperation. Not only are transfer prices problematic, it may very well be that the sought-after cooperation, and resultant synergies could have been achieved without any changes in ownership structure at all.

That is, it may be misleading to consider long-term cooperative agreements as a governance form that for all conceivable dimensions is positioned in between market-based and vertically integrated transactions (Heide, 1994). Therefore, we allow for the degree of functional-level cooperation in long-term cooperative agreements to vary as well. We consider SCFC to reflect a continuum from non-cooperative market-based transactions at one extreme to very cooperative exchange relationships at the other. This range exists independent of whether any ownership integration takes place or not.

In this fashion, a very high degree of SCFC between trading partners does not necessarily imply that the companies have given up their independent ownership structures. In fact,
many alliance structures depict cooperation and shared decision-making processes regarding relevant questions/problems at certain key functions (e.g., between a buyer and a seller), but totally autonomous structures at the corporate level. It is this simultaneous dependence and autonomy that makes alliances, a highly cooperative venture, an awkward organizational form.

**SCFC is different from the choice of coordination mechanism**

We also consider SCFC as conceptually distinct from the choice of coordination mechanism used to achieve integration among functional areas. Typical coordination mechanisms discussed in organizational literature include direct contact between managers who share a problem, liaisons linking departments with substantial contact, task forces working on temporary problems, more permanent cross-functional teams, and matrix designs with dual authority relationships (Galbraith, 1977; Lawrence and Lorsch, 1967; March and Simon, 1958; Thompson, 1967).

Guolla (1992) notes that a short-coming in this literature is that it often assumes that functional areas are integrated if they have coordination mechanisms in place. It is important not to confuse the state of being integrated with integration mechanisms. With respect to SCFC we therefore suggest that it would be more appropriate to consider specific coordination mechanisms as determinants of functional-level cooperation rather than to consider their presence as being evidence of functional-level cooperation. Thus, we consider structural and process characteristics of the interfunctional relationship as determinants of SCFC rather than as definitional components of SCFC in the conceptual framework presented earlier.

**SCFC is a bilateral construct**

Because cooperation by nature is a bilateral (or multilateral) construct, we describe SCFC by using other bilateral constructs such as collaboration or coordination as opposed to unilateral concepts such as power, control, and domination (Nevin, 1995). Power, for
example, is unilateral in the sense that it implies that one party can exercise power over another party in the exchange of goods or services. A high degree of cooperation, however, suggest that parties voluntarily engage in exchange activities. This is not to say, however, that power considerations are irrelevant in the study of functional-level cooperation in supply chains. Relationship dependence is likely to be related to the degree of power one party has over another (Anderson and Narus, 1990). Earlier we suggested that relationship dependence can act as a moderating factor in determining the appropriate level of SCFC. Nevertheless, we do not consider power as central to our definition of SCFC.

**SCFC is not the opposite of conflict**

Conflict is a very often researched construct in the literature on distribution channels (Stern and El-Ansary, 1988). Here, we do not conceptualize cooperation as the opposite of conflict, but instead consider these constructs distinct (cf. Robicheaux and El-Ansary, 1976). While cooperation and conflict are likely to be negatively related in a given supply-chain partnership, we believe that conflict and cooperation can coexist. Since conflict is event-specific, two supply-chain partners can disagree over some areas of interaction but cooperate perfectly well in other. This tension is perfectly normal and captures the ebbs and flows of supply-chain relationships that occur over time.

**A DEFINITION OF SUPPLY-CHAIN FUNCTIONAL COOPERATION**

We define SCFC in terms of two dimensions: cooperative behavior and cooperative sentiments. We expect that the presence of functional-level cooperation in a relationship can be both evidenced by tangible manifestations, and by intangible attitudes or sentiments that supply-chain partners hold toward one another. These dimensions are mutually reinforcing because cooperative behaviors are likely to result in more cooperative sentiments, and vice versa. For example, when supply-chain partners change
their behaviors in order to adapt to the activities of each other, trust is built which provides a foundation for further cooperation to develop (Johanson and Mattsson, 1987). We suggest that each of the two SCFC dimensions is multidimensional and, in this section, we will describe each of the components. To begin, SCFC is the extent to which an interfunctional relationship across organizational boundaries in a supply-chain partnership is characterized by cooperative behavior and cooperative sentiments:

- **Cooperative behavior**, in turn, is defined as the units' (1) investment in collaborative efforts toward the attainment of mutual goals, and (2) flexible adaptation.
- **Cooperative sentiments**, in turn, is the degree to which the functional areas feel (1) long-term commitment, (2) trust, and (3) social bonding with respect to each other.

**The components of SCFC's cooperative behavior dimension**

Building on work by Alter and Hage (1993, p. 82), we consider cooperation as a construct that implies more than mere coordination. Coordination captures a linking and scheduling of workflow activities. The coordinative aspects of cooperation are reflected in the investment in collaborative efforts toward the attainment of mutual goals. "Collaborative efforts," suggest that mutually consequential activities are being performed jointly in support of mutual goals. The second component of SCFC's cooperative behavior dimension, **flexible adaptation**, is the extent to which the functional areas adapt their behaviors to environmental changes for the benefit of both parties (Heide, 1994; Noordewier, et al., 1990). Adaptation by parties is necessary for business relationships to be sustainable (Hallén, Johanson and Seyed-Mohamed, 1991). Flexible adaptations do not have to be large, sudden adjustments; more typically, they represent a gradual process of interaction (Johanson and Mattsson, 1987; Thompson, 1967). For instance, one partner will, over time, align its processes to accommodate its partner. Such action tends to build closer bonds between parties and raises both the real and psychological switching costs.
The components of SCFC's cooperative sentiments dimension

Our first component of cooperative sentiments is *long-term commitment*. Long-term commitment is a central construct in interorganizational cooperation and is defined as the degree to which supply-chain partners believe an ongoing relationship is so important as to warrant maximum efforts at maintaining it (Morgan and Hunt, 1994). This construct is relevant also at our functional level of analysis, since interfunctional relationships in supply-chain partnerships gradually incorporate the participating supply-chain organizations' level of commitment (Hallén, Johanson and Mohamed, 1987). The development of long-term commitment takes time, but at advanced stages of cooperative relationships, supply-chain partners “purposefully engage resources to maintain the relationship” (Dwyer, et al., 1987). Such investments signal credibility of a partner's commitment, which enhances both trust (Anderson and Weitz, 1992; Heide and John, 1992) and social bonds (Young and Denize, 1995), the other two components of cooperative sentiments.

*Trust* is also a critical construct in the development of interorganizational relationships (Håkansson, 1982) and is defined as one party's willingness to be vulnerable to another party based on the belief that the latter party is (a) competent, (b) open, (c) concerned, and (d) reliable (Mishra, 1996). The development of trust is also an incremental process and is closely related to long-term commitment (Morgan and Hunt, 1994). The more supply-chain partners trust each other, the more they commit to the relationship (Achrol, 1991), which, in turn, further enhances the level of trust. Finally, *social bonding* is the degree of mutual personal friendship and liking shared by the buyer and seller (Wilson, 1995). Social bonding is an important aspect of cooperative sentiments, since the development of mutual trust and commitment is built on social bonds (Alter and Hage, 1993, p. 67; Håkansson, 1982, p. 17). Social bonds can effectively act to preserve relationships that are strained by short-term economic downturns or inequities in the sharing of the rewards.
CONCLUSION AND IMPLICATIONS

The value of supply-chain management is increasingly being announced by academics and practitioners alike. A supply chain can achieve outcomes as if it was operating as one large “quasiorganization” (Achrol, 1991), while the participating organizations can remain flexibly specialized with separate ownership structures. Still, it has to be recognized that the interorganizational exchanges implied by supply chains represent complex interaction patterns which calls for the emergence of “boundary-spanners” (Aldrich, 1979). Not only will more employees need to be involved in boundary-spanning activities, these activities will cross a number of different functional areas.

Functional differentiation previously called for increased integration within companies (Lawrence and Lorsch, 1967); today, differentiation among companies in a supply chain calls for increased levels interorganizational integration (Alter and Hage, 1993, p. 240). For supply chains to function as coordinated wholes, horizontal interfunctional structures and processes must be established that cross the boundaries of the participating organizations. This implies that functional areas need to achieve a state of cooperation not only with other functions in their own organizations, but also with functions in other supply-chain organizations. We addressed this critical interface between functions in different supply-chain organizations.

Interorganizational cooperation has been researched in many different contexts such as buyer-seller relationships (e.g., Dwyer, et al., 1987), distribution channels (e.g., Anderson, Lodish and Weitz, 1987), and strategic alliances (e.g., Ring and Van deVen, 1992). This literature has primarily addressed interorganizational cooperation from a very senior management perspective; often being more preoccupied with the choice of institutional governance form than how interorganizational cooperation is implemented at the operational level (Alter and Hage, 1993, p. 98). To be sure, much responsibility for making interorganizational cooperation happen rests on the shoulders of functional
managers. Simply, the establishment of cooperative interorganizational relationships implies a heightened division of labor between organizations. This division of labor will increase the degree of interdependence among functional-level processes (Van de Ven, Delbecq and Koenig, 1976).

**Implications for future research**

It is our hope that the theoretical foundation developed here can provide the impetus needed to encourage empirical research on functional interfaces across supply-chain organizational boundaries. Because we have focused solely on the development of the definition of SCFC, a logical next step would be to pursue work on the identification of determinants, consequences, or moderating factors captured in the conceptual model presented earlier. Such an undertaking is needed to establish the validity of our focal construct, supply-chain functional cooperation. Is it correct to specify SCFC as a two-dimensional construct? Also, it is important to examine how these different dimensions interrelate. Furthermore, it would be useful to assess what are the relevant interfunctional processes that emerge as SCFC is operationalized.

**Determinants**

The appropriateness of our proposed SCFC determinants also need to be confirmed empirically. From a theoretical perspective, it is worth noting that we see structural and process characteristics of the interfunctional relationship as determinants of SCFC rather than as definitional components of SCFC. It is important to separate integrating mechanisms from the state of being integrated (Guolla, 1992). Beyond considering more characteristics of the interfunctional relationship as SCFC determinants, further studies can include characteristics of the respective organizations, such as senior management commitment, or degree of centralization, formalization, and participation.
Consequences

Regarding the study of SCFC consequences, we anticipate a key challenge to be the refinement of the measures of supply-chain performance so that they also tap constructs at the functional level of analysis. Alternatively, if more aggregate supply-chain performance measures are used, SCFC also need to be aggregated to reflect this level of analysis. For example, to what extent is the total performance of a buyer and a supplier affected by the overall degree of SCFC in the different interfunctional relationships that cross the interface between the buyer and the supplier?

Moderating factors

Theoretically, our treatment of moderating factors is also of interest. Instead of using environmental and situational circumstances as determinants of relationship structure or governance form, our conceptual framework considers these factors as motivators for a certain relationship form. While these contingencies may very well be strong motivators for SCFC, they are not the mechanisms by which SCFC actually is achieved. A practical benefit of separating these two sets of factors is that our resulting model shows more clearly to managers where they can have an impact.

Managerial implications

Senior managers also need to understand what it actually means to cooperate at the functional level across organizational boundaries. Only with such understanding will they be better able to allocate resources to support the development of such cooperation and learn to link this cooperation to appropriate outcomes. Senior managers need to be aware of when such efforts are worthwhile and this can also be helpful in the determination of what companies are preferable partners. For the functional manager questions of implementation advance to the fore. Such issues encompass the allocation of time and resources to programs that will result in favorable mutual outcomes for both trading partners.
To think of supply-chain management as a cost reduction mechanism only foregoes any attempt to leverage capabilities that might result in additional revenue. Our model provides a framework in which processes encourage the interaction and dialogue that results in revenue-enhancing behaviors on the part of supply-chain partners. Only through cooperative actions can supply-chain members remain mutually focused on the need to work together to achieve end-user satisfaction.
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