

Investigating cooperative purchasing performance - a survey of purchasing professionals in Dutch hospitals

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Abstract:

Aim: Cooperative purchasing is considered a promising area for lowering the cost in the health care sector, although recent initiatives show mixed results. The purpose of this study is to find a thorough explanation for the performance of cooperative purchasing in healthcare by investigating the role of trust, commitment, organizational factors (i.e. group formality, and IT system effectiveness) and interpersonal skills (i.e. teamwork skills, and communication).

Design / Research methods: A conceptual model for the performance of cooperative purchasing was developed. This model was empirically validated using a survey of 88 Dutch hospital purchasing professionals.

Conclusions / findings: Analysis shows a significant impact of trust and commitment in cooperative purchasing groups on performance. Group formality and teamwork skills appear to be essential for achieving trust and cooperative purchasing performance. We also found a positive impact of IT system effectiveness on commitment, not on trust. Positive feelings about the group and positive expectation about the continuity of the group can be stimulated through effective IT systems. Since proper IT support is often neglected in many healthcare organizations, management efforts to improve IT systems could truly facilitate the tactical purchasing process of cooperative purchasing in hospitals.

Originality / value of the article: Many cooperative purchasing initiatives suffer from conflicts over the allocation of savings, time, and costs. Despite the growing importance of cooperative purchasing, few empirical studies have explored the effects on hospital performance. Our study extends previous research by investigating the relationships between trust, commitment, and the performance of cooperative purchasing (1) and the impact of organizational factors and interpersonal skills on trust and commitment in purchasing groups within a healthcare context (2).

Key words: cooperative purchasing, healthcare, trust, commitment, cooperative purchasing performance

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1. Introduction

Most OECD countries are faced with a continuous growth in health expenditures as a share of GDP, which has resulted in a collective concern for controls of costs and systems efficiency (Rego et al. 2014). The United States currently spends approximately 18% of the national GDP on health services with projected increases of up to 20% by 2021 (e.g. Spaulding et al. 2014; Elmuti et al. 2013). The life expectancy of people in developed countries is rising fast. The expenses on health and welfare costs have increased significantly in the last ten years. This growth is largely attributed to the general aging of the world population and the growing number of age-related health problems (e.g. Schut, Van den Berg 2010; Lovelock 2010). As the population ages, people require more health care. Another reason is the expansion of healthcare offerings and the improved technology (Van Ewijk et al. 2013). Healthcare costs are continuously increasing, and healthcare providers are more and more under cost and quality pressures (Chakraborty et al. 2014) and efficiency has emerged as the central goal to the operations of health care organizations (Al-Amin et al. 2016). Political choices must be made concerning access to healthcare, and also how to finance healthcare. These problems are easier to handle when healthcare is delivered in a more efficient and cost-effective way (e.g. Gelderman, Albronda 2017). Therefore, all options to achieve efficiency gains should be addressed.

Procurement is considered to be a promising area for lowering the costs in the health care sector (Walker et al. 2013). Horizontal collaborative purchasing has often been cited as a way for hospitals to address the challenges of the rising healthcare costs (e.g. Essig 2000; Burns, Lee 2008). However, empirical evidence regarding the effects of cooperation on hospital performance is scarce (Büchner et al. 2015), while initiatives of Dutch hospitals have had mixed results (Kusters, Versendaal 2013). Collaborating organizations struggle to develop and maintain sustainable inter-organizational relationships (Schotanus et al. 2010). For instance, trust and commitment are commonly considered key success factors for cooperative purchasing. However, in empirical studies trust does not always appear to have a

significant impact on cooperative purchasing performance (e.g. Schotanus et al. 2010), while commitment was not always found effective (e.g. Muhwezi 2010).

These relation-specific factors are particularly relevant for cooperative purchasing in healthcare, since members of different institutions need to work together. It is important that members are prepared to invest in the continuity of the purchasing group (commitment) and that they can rely on a fair allocation of costs and savings (trust). We investigate trust and commitment as outcome (dependent) variables which is not uncommon in collaboration research (e.g. Kwon, Suh 2004). In turn, trust and commitment in cooperative purchasing are influenced by different antecedents. This study investigates the impact of organizational factors (i.e. group formality, and IT system effectiveness) and interpersonal skills (i.e. teamwork skills, and communication) on trust and commitment in cooperative purchasing groups.

Our study extends previous research by investigating the relationships between trust, commitment, and the performance of cooperative purchasing. In addition, we examine the impact of organizational factors and interpersonal skills on trust and commitment in purchasing groups within a healthcare context. A conceptual model for the performance of cooperative purchasing was developed. This model was empirically validated using a survey of 88 Dutch hospital purchasing professionals.

2 Literature review

2.1 Cooperative purchasing in healthcare

Procurement in healthcare is an important area where the efficiency can or should be increased (Walker et al. 2013) and cooperative purchasing is considered a promising venue for lowering the procurement costs in this sector (Nollet, Beaulieu 2005). The procurement function in Dutch healthcare is characterized by centralized purchasing and loose cross-unit coordination (Ruiter et al. 2011). Getting compliance from internal users is a challenging and a crucial task for purchasing in healthcare. Top management support is important (e.g. Birken et al. 2015), although physicians (e.g. surgeons) have a major influence on the purchase of a variety of expensive products (Schneller 2009). The selection of suppliers is often determined

by a physician's preference (Chen et al. 2013). Therefore, purchasers must generate support and consensus for their purchasing projects, typically through cross-functional teams (Ruiter et al. 2011). These teams are not only needed, but often required by the government due to the risk factors involved. Commodities and standardized items seem better suited for cooperative procurement. Moreover, most hospitals lack sufficient IT support for the tactical purchasing process (Ruiter et al. 2011).

Cooperative purchasing can be defined as “the cooperation between two or more organizations in a purchasing group in one or more steps of the purchasing process by sharing and/or bundling their purchasing volumes, information and/or resources” (Schotanus, Telgen 2007: 53). This definition takes into account typical motives for cooperative purchasing: the bundling of purchasing volume, the distribution of resources, and the sharing of information (Tella, Virolainen 2005). Furthermore, the definition is not limited to mere contracting, but includes all the possible steps of the purchasing process (for example, bidding and negotiating); it also takes various forms of purchasing groups into account. In this study, the joined purchasing activity will be called ‘cooperative purchasing’ and the entity of the group where this activity is taking place will be referred to as ‘purchasing group’. The buyers of a purchasing group have to define and combine their individual requirements. Activities such as supplier selection, negotiation and contract management are most commonly transferred to the purchasing group (Gobbi, Hsuan 2015).

Cooperative purchasing is considered to be especially interesting for public organizations, since they usually do not consider themselves competitors (Schotanus, Telgen 2007). Cooperative purchasing has been practiced intensively by hospitals which usually have similar requirements (Gobbi, Hsuan 2015). Hospital pooling alliances were found successful in purchasing commodity and pharmaceutical items (Burns, Lee 2008). Still, many public organizations have difficulties in sustaining interorganizational relationships in the form of purchasing collaborations (Schotanus et al. 2011). Due to the specific characteristics of the healthcare sector, these initiatives are faced with considerable problems (Rego et al. 2014). Although coordination efforts are made, no cost reduction and quality improvement program appears to align the entire health care supply chain from

providers to purchasers (Ford, Scanlon 2007). The supply chain is managed through a complex line of command, balancing power relationships among various professional groups (De Vries et al. 1999; Rego et al. 2014). A specific challenge for cooperative purchasing of medical products is handling supplier lock-in situations due to the medical training of specialists (Carrera et al. 2015).

Nollet and Beaulieu (2005) described two different possible governance structures for cooperative purchasing in healthcare. The first is the “cooperative structure”, where the purchases to be performed by the group are distributed among members. In this structure, the members have more influence and, thus, there is more room for customer-specific requirements. This makes this structure suitable for medical product categories (Meijer 2014). Second, there is the “third party structure”, which is a distinct organization negotiating and writing contracts according to a mandate given by the members. This structure is suitable for procuring standard products and services (Meijer 2014). Most purchasing groups in the Netherlands are cooperative structure groups, while in other countries, such as Germany, USA and Canada, the third party structure is most commonly applied (Schneller 2000).

2.2 Performance of cooperative purchasing

All studies face the difficulty of evaluating the performance of alliances (Hoffmann, Schlosser 2001). It is difficult to objectively measure the performance of cooperative purchasing, as it depends on the objectives of the specific group. The most important objectives found by Tella and Virolainen (2005) were the expected cost savings due to negotiating power, the efficiency gains, and the information exchange between members about price levels and suppliers. The rationale behind cooperative purchasing is to have more volume and to share workload to reduce costs (Schneller 2000). Bundling volume is called consolidation; consolidation is a procurement practice used to transfer activities to a central entity such as bidding, supplier evaluation, negotiation, and contract management. A purchasing group usually provides additional power to the members of the group in their negotiations with suppliers. Consequently, members should get more favorable conditions than they would have obtained individually. The average saving for hospitals that

participate in cooperative purchasing has been estimated between 10%-25% (Cleverley, Nutt 1984; Nollet, Beaulieu 2003, 2005). The hospitals in the Intrakoop initiative reported an average saving of 31% for the purchase of pacemakers (Carrera et al. 2015).

In addition to better contractual conditions there are other important reasons for joining a purchasing group. As the negotiation process is performed by only one organization, instead of many, joining a purchasing group also reduces administrative costs (Essig 2000). In their study of the motives for joining purchasing groups, Tella and Virolainen (2005) found that, in addition to the cost savings, information sharing between organizations was another important motive. Individual companies valued the information of suppliers and market prices. Next to cost savings, cooperative purchasing is also valued for its indirect benefits in terms of process optimization and knowledge sharing (Carrera et al. 2015). Walker et al. (2013) found that product innovation and ensuring supply are important themes for health care providers. In a general sense, the performance of purchasing groups is determined by the degree of achieving their hard and soft objectives (Schotanus et al. 2010).

2.3 Development of hypotheses

Trust has been widely used in studies on buyer-supplier relationships. Trust is considered central to all relational exchanges (Morgan, Hunt 1994). Trust is believed to be a crucial factor for achieving cooperation between parties. In the organizational economics and transaction cost literature, trust has been theorized to reduce opportunistic behavior and thereby to reduce the need for control and transaction costs (e.g. Dyer 1997; Hofmann, Schlosser 2001). According to Williamson (1979), relations that feature personal trust will survive greater stress and display greater adaptability. Transaction costs are supposed to be lower in cases of high levels of trust, since less monitoring, control, and cooperative agreements are necessary. Therefore, trust can be considered an important antecedent of cooperative purchasing performance (cf. Schotanus et al. 2010).

Zaheer et al. (1998) defined trust as the expectation that an actor can be relied on to fulfill obligations (1), will behave in a predictable manner (2), and will act and

negotiate fairly when the possibility for opportunism is present (3). In cooperative purchasing, all three elements are likely to be important for successful cooperation. The third element seems to be particularly relevant for cooperative purchasing, since fair allocation of cost savings between the members is critical for the performance of cooperative purchasing (Gobbi, Hsuan 2015). The workload is divided among group members, for instance negotiating the terms for buying a specific product category. Members need to trust their negotiator to act in the best interest of the entire group, instead of pursuing their own (short-term) interests. Empirical studies indicate that the development of (mutual) trust is critical for cooperative purchasing, promoting savings, transparency and simplification (Gobbi, Hsuan 2015). We hypothesize:

(H1) Trust has a positive impact on the performance of cooperative purchasing in healthcare.

Commitment is also central to all relational exchanges between partners. Morgan and Hunt (1994: 23) defined commitment as “an exchange partner believing that an ongoing relationship with another is so important as to warrant maximum efforts at maintaining it; that is, the committed party believes the relationship is worth working on to ensure that it endures indefinitely”. Commitment causes entities to make short-term sacrifices for the long-term good. When commitment is high, partners in the collaboration want to continue their relationship, which reduces opportunism (Muhwezi 2010).

Group members must believe that the group is worth working in (Schotanus et al. 2010; Coun et al. 2015). The performance of cooperative purchasing apparently depends on the willingness of the group members to continue and invest in ‘their’ purchasing group (Kumar et al. 1995). Walker et al. (2013) found commitment to be the most important enabler of cooperative purchasing among the healthcare respondents. Furthermore, in healthcare, there is no shareholder pressure for direct results and the long-term view prevails over the short-term results. Establishing cooperation requires much energy and time from numerous individuals from different organizations. These set-up costs, and the partner scarcity, are likely to reduce short-term opportunism. We hypothesize:

(H2) Commitment has a positive impact on the performance of cooperative purchasing in healthcare.

Formality refers to organizational structures, such as rules, regulations, and the division of labor. Some argue that less formality is necessary in relationships with high levels of trust and commitment (e.g. Klein Woolthuis 1999) or even that formal written agreements between parties are not very important for cooperative behaviors (e.g. Hendrick 1996). However, in order to minimize uncertainty and conflicts, it is also argued that purchasing groups need formal agreements on important decisions (Schotanus et al. 2010). Agreements have to be made on decision making and on reporting group performance. Other formality aspects are regular organized meetings and the use of several procedures and rules, such as joining and leaving rules, duties and rights (Schotanus, Telgen 2007). The formality aspects of the group refer to the rules of the game necessary to reduce uncertainties and possible opportunistic behavior. Hoffmann and Schlosser (2001) found that ‘a precise definition of rights and duties’ is the most important factor.

We propose that purchasing groups have a need for formal structures and rules. In collaboration we expect that group formality contributes to the levels of trust and commitment. This leads to the following hypotheses:

(H3) Group formality has a positive impact on trust (3a) and on commitment (3b) in cooperative purchasing in healthcare.

Interfirm communication includes sharing of meaningful and timely information between firms (Anderson, Narus 1990). Inter-organizational communication has been documented as a critical factor in promoting strategic collaboration among firms (Paulraj et al. 2008). In cooperative purchasing literature this importance is also recognized. In spite of this recognized importance, communication was almost uniformly viewed as the one area which consortia had failed to manage effectively (Liang, Cotton 1997). In addition, information sharing reduces information asymmetry as well as the potential for opportunism, this in turn reduces transaction costs (Dyer 1997). Purchasing professionals should demonstrate communications skills for inter- and intra-organizational collaboration (e.g. Prajogo, Sohal 2013). Communication fosters trust and commitment by assisting in resolving disputes and aligning perceptions and expectations (e.g. Morgan, Hunt 1994). Communication between group members can be considered an antecedent and necessary condition for achieving trust and commitment in purchasing groups. Communication, in terms

of knowledge-sharing, enables collaboration in collaborative procurement (Walker et al. 2013). This leads to the following hypothesis:

(H4) Communication has a positive impact on trust (4a) and on commitment (4b) in cooperative purchasing in healthcare.

The support of IT systems in the tactical purchasing process in healthcare lags behind other sectors, and is still in its first phase of maturity (Ruiter et al. 2011; Collum et al. 2016). Walker et al. (2013) found perceived problems with a lack of a common coding system, lack of data, and having to rely on suppliers for data. Many have raised the importance of adopting IT supporting tools in collaborative healthcare groups for communication and contracting purposes (e.g. Gobbi, Hsuan 2015). The supposition in this study is that to be successful in cooperative purchasing, information and product data need to be shared, and compared effectively. The exchange of information is important not only during the initial selecting, and contracting phase, but also during the “contract life” for interventions and evaluation causes, like contract management, supplier performance improvement and compliance measurement. Information sharing reduces information asymmetry as well as the potential for opportunism, this in turn reduces transaction costs (Dyer 1997). The collaborative process and communication in purchasing groups can be improved by using effective IT systems. Concerns about losing control of the process can be reduced with IT programs that show real time progress and that enhance the transparency for all members about the behavior of a lead buyer (Kusters, Versendaal 2013). These benefits of effective IT systems are likely to contribute to the trust and commitment of members within collaborative purchasing groups. We hypothesize:

(H5) Effective information systems have a positive impact on trust (5a) and on commitment (5b) in cooperative purchasing in healthcare.

Increasingly purchasing is done in cross-functional teams (e.g. Driedonks et al. 2014), also in healthcare (Ruiter et al. 2011). Giunipero and Percy (2000) introduced the “world-class skill set” which includes the ten most important purchasing skills. One of these skills refers to the ability to work in teams. Studies indicate that the ability to work effectively in groups/teams is considered a critical skill for supply chain professionals (e.g. Prajogo, Sohal 2013). Working in cross-

functional sourcing teams requires combining knowledge and skills from people with different functional backgrounds (Driedonks 2011). Based on an extensive literature review, Stevens and Campion (1994) identified generic skills and abilities necessary for teamwork by individual members. Teamwork skills include interpersonal skills (e.g. conflict resolution, problem-solving) and self-management skills (e.g. goal-setting, planning, task coordination).

Cross-functional purchasing in healthcare requires regulations due to the risk factor of medical technology and also to gain compliance with internal users. Purchasing professionals in healthcare act within a system with many stakeholders (e.g. patients, insurance companies, suppliers, physicians, technicians) and have to balance different interests and influences. Healthcare purchasing is highly dependent on physicians, due to their internal power position and their preferences for specific materials and expensive products (e.g. Rego et al. 2014; Schneller 2009). Due to these characteristics, it is even more important that purchasing professionals possess teamwork skills for their work in a cooperative purchasing teams. This leads to the following hypotheses.

(H6) Teamwork skills have a positive impact on trust (6a) and on commitment (6b) in cooperative purchasing in healthcare.

3. Research method

The hypotheses were tested using a survey administered in two rounds to all purchasing professionals who have experience in cooperative purchasing, employed in Dutch hospitals. Based on their experience and position in purchasing groups, they appear appropriate to study factors explaining the performance of cooperative purchasing. An e-mail invitation was sent to the public e-mail address of each purchasing department of 69 hospitals, reaching a total number of 396 purchasing professionals. The invitation gave access to an online questionnaire. After two weeks, a reminder was sent and a link was placed in a newsletter of the Dutch purchasing association (NEVI).

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In order to stimulate response, the research design included a special incentive: for each valid response, €5 was donated to the CliniClowns foundation that sends clowns to bring joy and distraction for sick or disabled children. Another incentive was that the respondents were promised to receive a summary of the study results. The questionnaire was pretested to improve readability, question order and to improve ambiguous questions. A total number of 88 completed questionnaires were received, which resulted in an effective response rate of 22.2% (88/396). Some 25% of the respondents have ‘Purchasing director’ as their job title. The other professional purchasers were purchasing managers (14.8%), senior buyers (21.6%) and buyers (33.0%). Remaining respondents were mainly (senior) purchasing advisors.

The variables in the hypotheses were measured as multiple-item constructs on 5-point Likert-scales. All operationalizations were derived from measurement scales used and validated in other academic studies. *The performance of cooperative purchasing* was measured by using the eight items from Rozemeijer (2000). This study recognized the benefits that are directly related to the results of purchasing cooperation initiatives. The first, fixed part of the items read ‘cooperative purchasing has led to the following benefits in our organization, that were otherwise not possible’. The items were related to various benefits, such as cost savings, value creation, supplier and parts reduction, purchasing professionalism, and new product development. The *trust* construct was measured by the seven items used in Doney and Cannon (1997), including the credibility and the benevolence of the purchasing partners. The *commitment* construct was based on the operationalization of Kumar et al. (1995). The six items covered the willingness to continue and to invest in the purchasing group. The *group formality* is measured by two items from De Jong et al. (2001) that include a question about procedures and rules, and a question concerning the goals and objectives. The construct refers to the “rules of the game”, necessary to reduce uncertainties and to enhance efficiency. To measure the *IT system* construct, the six items from Davis (1989) were used, covering effectiveness and efficiency of the IT system that was used in the purchasing group. *Teamwork skills* are important for cross-functional purchasing teams that need to combine knowledge and skills from members with different functional backgrounds (Driedonks 2011).

This study has used four items, based on Tasa et al. (2007) and Stevens and Campion (1994), emphasizing skills for involving participants in group activities and skills for conflict resolution. The *communication* construct is measured by six items, obtained from Paulraj et al. (2008). The items refer to sharing and exchanging information by members of the purchasing group.

4. Results

First we examine the reliability and validity measures for the measurement models (4.1). Then we evaluate the structural model (4.2).

4.1 Evaluation of measurement models

Examining Indicator Loadings

In our study, both Cronbach's alpha values and composite reliability values are well above the threshold values of 0.60 and 0.70 respectively (Hair et al. 2014), suggesting that internal consistency reliability of each reflective latent variable is acceptable. All Average Variance Extracted (AVE) values are above 0.50, demonstrating unidimensionality and suggesting that convergent validity of each latent factor is acceptable. Another measure of convergent validity of the measurement models is found by computing the standardized loadings for indicators and generating Bootstrap t-statistics for their significance. In our study all standardized loadings are found significant at a significance level of 0.001, confirming convergent validity.

To determine the discriminant validity of our indicators, we first look at the matrix of loadings and cross-loadings for all reflective items in the model. The loadings of the items should be greater for the latent variable to which they theoretically belong than for any other latent variable (cf. Lowry, Gaskin 2014). With the exception of two indicators from the teamwork skills construct, we found no cross loadings that exceed the indicators' outer loadings. Thus, there is considerable indication that discriminant validity is met. We conclude that all

constructs show evidence for acceptable internal consistency reliability, convergent validity and discriminant validity.

4.2 Evaluation of the structural model

To assess and evaluate the structural model estimates we looked at collinearity, size and significance of path coefficients, and R² values. The estimation of path coefficients in the structural model is based on OLS regressions of each endogenous latent variable on its corresponding predecessor constructs. Therefore, the path coefficients might be biased if the estimation involves significant collinearity among the predictor constructs and make them quite unstable and thus not generalizable (Hair et al. 2014). A measure of collinearity is the variance inflation factor (VIF). To assess collinearity, we consider VIF values above 5 in the predictor constructs as indicative of a potential collinearity problem. VIF values in our study are well below the threshold value of 5, indicating that collinearity is not an issue.

Table 1 presents the estimates of path coefficients of the proposed model and respective t-values, significances and confidence intervals. Five of the eleven hypothesized paths are statistically significant. Figure 1 shows the structural model including the size and significance of path coefficients, as well as R² values.

Table 1. Size and significance of the Structural Model Path Coefficients

Path	Path Coefficients	t Values	Sign. Levels	p Values	95% C.I. (low)	95% C.I. (high)
Commitment -> Performance	0.309	2.613	**	0.009	0.059	0.502
Communication -> Commitment	-0.013	0.105	N.S.	0.916	-0.278	0.227
Communication -> Trust	-0.073	0.702	N.S.	0.483	-0.261	0.155
Group formality -> Commitment	0.129	1.109	N.S.	0.267	-0.095	0.353
Group formality -> Trust	0.491	4.802	***	0.000	0.280	0.679
IT systems -> Commitment	0.457	4.416	***	0.000	0.239	0.649

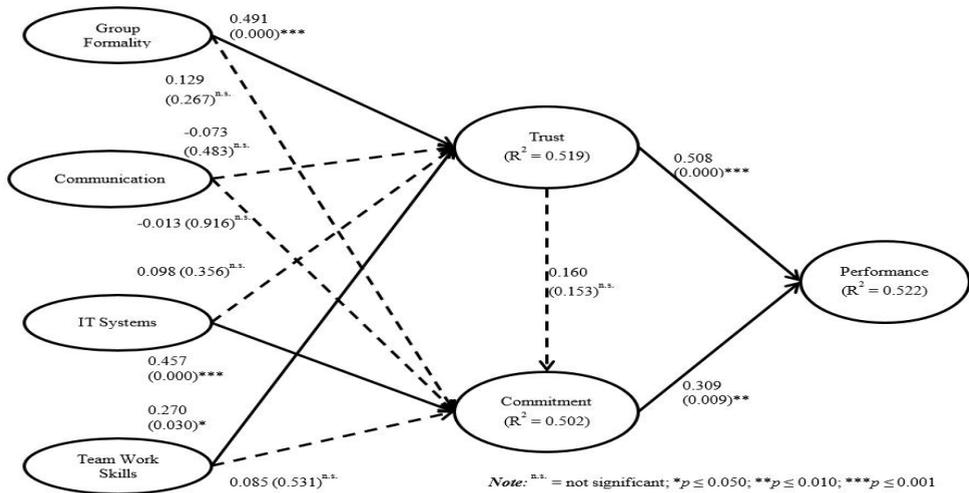
Table 1. Cont.

Path	Path Coefficients	t Values	Sign. Levels	p Values	95% C.I. (low)	95% C.I. (high)
IT systems -> Trust	0.098	0.923	N.S.	0.356	-0.093	0.315
TW skills -> Commitment	0.085	0.626	N.S.	0.531	-0.179	0.350
TW skills -> Trust	0.270	2.170	*	0.030	0.018	0.505
Trust -> Commitment	0.160	1.428	N.S.	0.153	-0.045	0.396
Trust -> Performance	0.508	4.878	***	0.000	0.331	0.734

Note: N.S. = not significant; * $p \leq 0.050$; ** $p \leq 0.010$; *** $p \leq 0.001$; C.I. = Confidence Interval

Source: authors' own elaboration.

Figure 1. Empirically validated model



Source: authors' own elaboration.

5. Discussion and recommendations for further research

Our results confirm that trust and (to a lesser extent) commitment have a positive impact on performance. These findings were expected, although the results are not always found in other empirical studies (e.g. Muhwezi 2010; Schotanus et al. 2010). The results suggest that cooperative purchasing groups should focus on developing trust and commitment. Purchasing professionals should pay attention to their own credibility and the benevolence toward other members. Although the findings on teamwork skills and IT systems appear to be valid, these variables were not included in previous studies on cooperative purchasing performance.

The findings of our study contradict publications that consider formal agreements and procedures are not very important for cooperative behaviour (e.g. Hendrick 1996; Schotanus et al. 2010), especially in relationships with high levels of trust and commitment (e.g. Klein Woolthuis 1999). The results of our study indicate that we have to make a distinction between the impact on trust and the impact on commitment. Group formality is positively associated with trust, not with commitment. Group formality might be more important for commitment and performance in cooperative purchasing among private companies because of their competitive environments and the pursuit of profits (Hoffman, Schloesser 2001).

Many hospitals must deal with supplier lock-in relations as a result of the preferences of medical specialist for certain materials, equipment and services (Carrera et al. 2015). Our study was limited to a sample of the professional purchasers. Future studies could incorporate the views and experiences of specific stakeholders, especially the powerful physicians.

The operationalization of communication in our study strongly focusses on sharing and exchanging information. The teamwork skills construct in our study also covers elements of interpersonal communication, e.g. involving other members in group discussions and group activities such as developing team strategies for team goals. The impact of communication on trust could be covered by the teamwork skills construct. Future studies could elaborate on other dimensions of communication and their influence on cooperative purchasing groups. The same

argument applies for group formality that includes elements of communication, e.g. items that refer to rules, procedures, and the setting of goals and objectives.

Our model includes trust and commitment as antecedents for cooperative purchasing performance. Obviously, many other factors may contribute to the success of joint procurement, for instance the institutional context and the organizational culture (cf. Tátrai 2015). Future research could include the financial accountability of clinical managers and the alignment between professional values and organizational requirements (cf. Macinati, Rizzo 2016). Reaching collective agreement can be a struggle by healthcare purchasing groups (e.g. Gobbi, Hsuan 2015). Future studies could investigate the impact of supplier management on the (different elements of) cooperative purchasing performance. Other critical elements of inter-organizational collaboration in healthcare are the content of the cooperation, the details of responsibility, and the compulsory or voluntary nature of participation of group members. Joint public procurement does not automatically yield cheaper and more efficient procurement (Tátrai 2015).

6. Practical implications

Cooperative purchasing has often been mentioned as a viable way for hospitals to efficiency and higher performance, although many initiatives typically fail. Studies report unclear and mixed findings on the variables that could explain the (lack of) success of cooperative purchasing in health care. We found direct effects of trust and commitment on cooperative purchasing performance. In addition, trust appears to be positively influenced by group formality and teamwork skills. Organizations should acknowledge that teamwork skills for conflict resolution and involving participants are important for achieving trust and performance. Analysis showed a significant impact of IT systems effectiveness on commitment, not on trust. Managers should invest in a workable, update IT system able to connect all participants. Purchasing group members should lobby for an effective IT system. Apparently, trust does not depend on IT systems to facilitate collaboration. Trust

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appears to be a behavioral factor that is not associated with the quality of supportive IT systems.

For successful management of a purchasing group good and effective IT systems for the tactical purchasing process for cooperative purchasing groups must be in place. Opportunities for management of successful cooperative purchasing are IT solutions for tendering, e-auctions, data management, spend analyzing, performance measuring, group decision support, etc.

Balancing the interests within and between participating hospitals requires special teamwork skills from all purchasing professionals involved. The analysis shows that involving members in group activities and solving potential conflicts are indeed essential skills for achieving the required level of trust within inter-organizational purchasing teams. It is thus very important to appropriately address conflicts as they arise. Training and selecting purchasing professionals on interpersonal skills, and especially in conflict resolution also seems to be an obvious route to increase trust and performance in cooperative purchasing.

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