

Application of the means-end value hierarchy model to understanding logistics service value

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Introduction

Logistics companies today recognize the importance of high levels of customer service. One of the most difficult tasks of providing that service is often the determination of what the customer truly values. Traditionally, logistics organizations have done an excellent job of managing and moving inventory – the operational aspects of logistics. However, logistics managers often struggle to identify the value-added activities that customers desire – the customer value aspects of logistics. In other words, does the customer value (or even notice) this excellent logistics operational management?

In the pursuit of competitive advantage, it is increasingly important to identify the demands and values of current and potential customers. This study applied a useful methodology from the behavioural sciences to assist logistics managers to determine the appropriate customer service activities, i.e. those the customer truly values. The use of the means-end value hierarchy model (MEVHM) clarifies the needs of the customer and provides a useful method to present relevant customer service information to logistics managers using customer behaviour tools.

The MEVHM has been used to help companies understand final consumers and the value they place on the companies' product/service offerings. However, this study applies its usefulness in a business-to-business logistics context. Understanding the values and needs of channel members is equally important as understanding the end user.

For the purposes of introducing the MEVHM to logistics research, this paper will present literature reviews of logistics service value and the MEVHM, followed by a detailed description of the methodology of the MEVHM. The defense logistics agency (DLA) provides data for a case study example application of this methodology. Example models will be presented for an individual customer, an aggregate for one DLA market segment and an overall DLA MEVHM. Finally, conclusions, managerial implications and future research opportunities will be discussed.

Logistics service value

There are many definitions and descriptions of how logistics creates value. The most traditional are based on the attributes of the creation of time and place utility (Mentzer *et al.*, 1989; Perreault and Russ, 1974). The so called “Seven Rs” describes the attributes of the company’s product/service offering that lead to utility creation through logistics value, i.e. part of a product’s value is the company’s ability to deliver the right product in the right amount at the right place at the right time for the right customer in the right condition at the right price (Coyle *et al.*, 1992; Shapiro and Heskett, 1985; Stock and Lambert, 1987). This definition implies that part of the value of a product is created by logistics service, i.e. the attributes of the process by which the item gets to the end user. Examples of historical, attribute-based measures of logistics customer service are per cent of items in stock, per cent of orders delivered on time, per cent of delivered items undamaged, etc. (For a more complete list of these attribute based measures, see (Mentzer *et al.*, 1989).) These attributes were considered the “value” provided by logistics service’s dimensions of availability, timeliness and condition (Mentzer *et al.*, 1989).

As the business environment has changed, the attribute-based definitions of logistics service have evolved. The basic concept of utility creation became inadequate to express fully the value created by logistics. The idea of value has been broadened to include numerous value-added tasks: packaging, third party inventory management, barcoding, information, etc. (Ackerman, 1989; Mentzer, 1993; Mentzer and Firman, 1994; Witt, 1991). The value-added concept has expanded the traditional time and place utilities to include form utility (e.g. final assembly of bulky product at the market) (Ackerman, 1991), but is still an attribute-based concept.

More recent definitions of logistics value focus more on the marketplace, customer service, core competences and competitive advantage. Logistics value is an important component of customer service just to maintain the status quo. Value-added is the extra service that provides competitive advantage in the marketplace (Gordon, 1989). Both the value and value-added concepts contain the basic logistics attributes. However, the more current concepts include the service and financial trade-offs involved to perform the additional services to provide exceptional customer service.

The literature suggests that logistics customer service is often defined as a component of, or used as a substitute for, logistics value (Langley and Holcomb, 1992). However, customer service has been just as difficult to define as value. The meaning of “customer service varies from one company to the next” (Stock and Lambert, 1987). La Londe and Zinszer (1976) provide a good description of how customer service adds logistics value through three components:

- (1) an activity to satisfy customers’ needs;
- (2) performance measures to ensure customer satisfaction; and
- (3) a philosophy of firm-wide commitment.

All three of these components are attribute-based. In their later work, La Londe *et al.* (1988) did broaden their definition to include “value-added benefits”.

Relating customer service in the logistics service context, Mentzer *et al.* (1989) argue that there are two elements in service delivery: marketing customer service (MCS) and physical distribution service (PDS). The authors recognized the complementary nature of the two elements to satisfy the customer and proposed an integrative framework of customer service. This view is shared by others (Rinehart *et al.*, 1989) and is thought of as an intellectual base for integrating marketing and logistics activities. Explication of the PDS dimensions and integrating those into overall customer service evaluation are necessary to meet customers’ expectations and needs (Mentzer *et al.*, 1989). This view is consistent with the concepts of service response logistics. Service response logistics positions logistics capabilities as the core competency of the firm in achieving customer value and satisfaction (Davis and Manrodt, 1991, 1993).

Foggin applied total quality management (TQM) statistical tools to quantify and close the gaps between customer desires and delivery performance, discussing how TQM measures could help managers to define, benchmark, redesign, control and monitor the results of a company’s customer service programmes (Foggin, 1991). This technique combines operational measures with the newer concepts of customer service and value, but still takes an attribute-based approach in that the gaps are defined by the company’s delivery programme.

All of these methods hold satisfying the customer through the delivery of relevant attributes as the cornerstone in successful logistics strategies. The concept of delighting the customer is moving into mainstream logistics (Global Logistics Research Team, 1995). These techniques attempt to define accurately the value of logistics service attributes and measure the impact on the customer and the firm. Companies are moving beyond the simple concepts of utility and logistics as a cost centre (Novack *et al.*, 1995). Note, however, that all these expanded definitions still take a perspective of what the company provides, i.e. they are still attribute-based (an operational definition of customer value). Little treatment is given to defining customer value from the perspective of what the customer values, i.e. a customer-based definition of customer value.

The service quality or “gaps” model (Parasuraman *et al.*, 1985) is an attempt to understand customer satisfaction from the perspective of what the customer values, not just in terms of the attributes the company delivers. The gaps model provides a method to measure some of the differences between customer perceptions and actual customer service on various attributes and to reduce those attributes to dimensions of value that are defined by the customers.

Despite some limitations of the gaps model, logistics researchers began to examine if the gaps model could be used to measure the value of the logistics service. Modifications were made to the original model by developing logistics attributes that fit into the previously customer-defined value dimensions and

identifying additional gaps that could be applied to the logistics service context (Lambert *et al.*, 1990). These views of services and logistics provided the building blocks to create a customer-based foundation for better definitions and measures of the value of logistics.

This use of customer-based definitions of customer satisfaction as a part of logistics value brings physical distribution research, that traditionally focused on more physically observable attributes of the phenomena, more in line with marketing which has advanced further in understanding such unobservables as customers' perceived value. Therefore, logistics practitioners are beginning to recognize the requirement for a method to understand better the needs of their customers beyond a set of readily measurable service attributes.

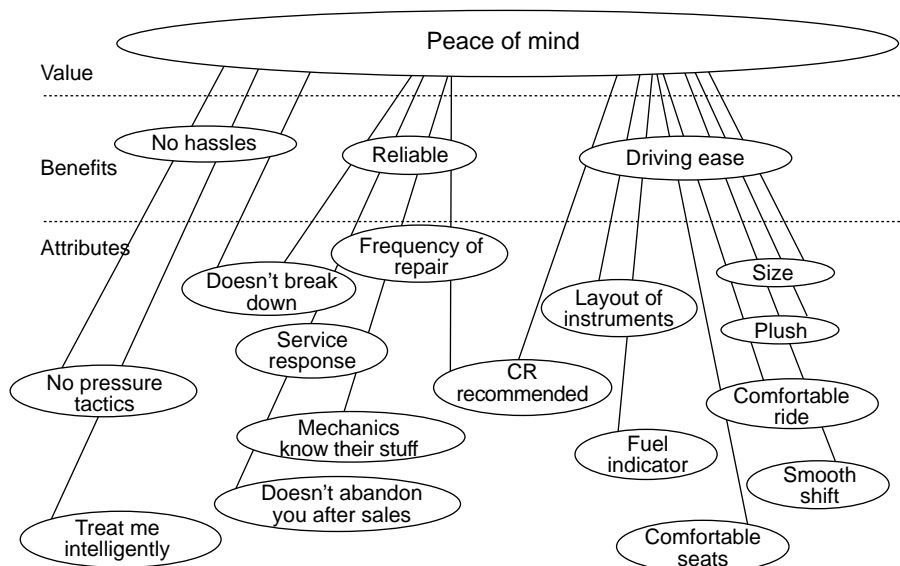
The means-end value hierarchy model

One approach which shows considerable promise in helping logistics managers to understand more fully what their customers value, not just their satisfaction with the attributes the company has traditionally measured, is the means-end value hierarchy model (MEVHM). The MEVHM has been used in the marketing discipline (particularly in consumer research) to explain how customers perceive and evaluate their product use experiences, what product attributes and benefits are sought by customers and why (Gutman, 1982; Zeithaml, 1988).

The MEVHM can be conceptualized as an interrelated network in which customers are motivated to achieve the goals they value by purchasing a given product/service (i.e. logistics services), based on specific product/service attributes sought and the consequential benefits and product/service value provided by the attributes. Customers are considered goal-oriented and being such, they seek the means that would enable them to achieve their ends (i.e. a means-end chain).

Such a network can be considered hierarchical because customers' overarching values determine the instrumental benefits which are sought. In turn, these benefits determine what specific product/service attributes are required to realize the desired benefits. The customer's thought process is conceptualized as being "top-down" rather than "bottom-up". This seems quite reasonable: customers seek attributes only as a means to achieve their already established desired benefits (which were, in turn, determined by their already established values), not the other way around. Figure 1 illustrates how such a hierarchy looked for one individual's purchase of an automobile (Woodruff and Gardial, 1996).

As it is shown, the car buyer had numerous specific attributes she sought. For instance, she wanted to have "comfortable seats" as an important product attribute which is highly specific. This attribute is directly related to another attribute, "comfortable ride". For her, "comfortable seats" are an essential part of "comfortable ride". The line from "comfortable seats" to "comfortable ride" further extends to one benefit, "driving ease". The "comfortable ride" is important to the extent that it leads to "driving ease", a benefit.



Source: Adapted from Woodruff and Gardial (1996)

Figure 1.
Means-end value
hierarchy model for
automobile purchaser

Certainly, “driving ease” is not achieved only by “comfortable seats” and “comfortable ride”. For this buyer, it takes some other attributes such as “layout of instruments” and “size”. Note that there is one more line that begins from “layout of instruments”, in addition to the extended line from “fuel indicator”. This indicates that this buyer made comments on “layout of instruments” with specific reference to the fuel indicator and as a more general attribute. As a general attribute “layout of instruments” should have an independent line extending to “driving ease” along with the other line which originated from “fuel indicator”.

Three seemingly independent benefits are in fact related in her mind, because these benefits are important to achieve her “peace of mind”. It is to say that she does not want “driving ease”, “reliability” or “no hassles” for their own sakes. They are desired because these benefits help her achieve “peace of mind”, Conversely, having “comfortable seats” is important not simply because she wants them but it is instrumental to “driving ease” and her “peace of mind”.

In recapitulation, attributes are the lowest level of the hierarchy and correspond to the specific product/service attributes. These attributes are typically used to describe the product by both customers and the provider company. In the logistics service context, they may include such attributes as mentioned earlier: per cent of items in stock, per cent of orders delivered on time and per cent of delivered items undamaged. These attributes normally are specific, tangible items that can be measured.

Benefits, the higher level, refers to the consequential benefits that derive from the use of the product with specific attributes. The customer buys a product or service as a bundle of attributes, expecting them to provide certain outcomes (benefits). Relative to the objective attribute level, benefits are more abstract, evaluative and subjective. This is due to the fact that the objective attributes are cognitively perceived and linked to a meaningful set of consequent benefits. The benefits describe a state of interaction between the product and the user (Woodruff and Gardial, 1996). In a business-to-business setting, trust between companies could be a benefit.

Desired values are at the top of the hierarchy and represent the user's guiding principles and ultimate end-states that are served by the benefits and the product/service attributes (the means to the end-state) (Woodruff and Gardial, 1996). The desired values are much broader than a specific purchase context. They may include views about recognition, security or even product-use ideas, such as "being an environmentally responsible consumer".

The MEVHM is capable of graphically describing these interrelationships among the factors at three different hierarchical levels (i.e. desired values, benefits and attributes). Using open-ended interview techniques derived from the model, the desired values, benefits and attributes sought in particular purchasing and usage situations, from the customers' perspectives, can be probed. This hierarchical view suggests the extent to which the desired values are met through the product/service use, again from the customer's perspective user (Woodruff and Gardial, 1996). The MEVHM allows us to gain a deeper understanding of not only specific product/service attributes, but also the benefits and underlying desired values that influence individual customers' expectations, satisfaction and their interrelationships (for a detailed description of the technique, see user (Woodruff and Gardial, 1996; Woodruff *et al.*, 1993)). Such information is of considerable value in strategic planning for competitive advantage.

Research purpose

The purpose of this research was to demonstrate the value of the MEVHM in determining, at three different hierarchical levels, how logistics customers perceive the services they receive. Such a determination takes more of a customer-based approach to logistics value than more traditional attribute-based approaches. Thus, it enhances the knowledge logistics managers have about their customers. Since this enhancement provides more information to logistics managers on what truly motivates their customers to use one supplier over another, it has considerable value as competitive advantage input to the strategic planning goal of achieving "logistics leverage" (Bowersox *et al.*, 1995).

Specific research with the Defense Logistics Agency (DLA) provided the setting for demonstration of the MEVHM.

Research setting

DLA performs logistical functions for the military services, the department of defense agencies and allied foreign governments. Currently, DLA manages over

\$22 billion in sales and over 4.5 million items for these agencies. DLA commissioned a research team to help improve the measurement and management of their customer service. The first step in this ongoing research was an attempt to understand DLA customer values and needs. This step involved the authors performing the qualitative data collection and analysis, which led to the MEVHMs for DLA.

Thirteen focus group sessions were conducted. Each lasted approximately two hours. The first author acted as the moderator for all the sessions. Since the goal was to have the DLA customers provide their own, unfiltered views through the interaction of the group, the moderator provided only general topics to start the meeting. This unstructured technique is appropriate to gather data when the objective is to identify underlying themes (Calder, 1977).

The participants and topics varied across the focus groups. Each of the participants in the 13 focus group sessions was identified with a particular product category of DLA. These included medical, fuels, electronics, clothing and others. The individuals in each focus group were a mixture of DLA customers for that particular product category (i.e. the fuels session included civilian and military personnel with fuel logistics responsibilities). The general topics included four basic areas:

- (1) the nature of the participants' work in relation to DLA;
- (2) evaluation of the working relationship with DLA;
- (3) assessment of DLA performance; and
- (4) perceptions of what DLA does well and/or poorly.

Each of the focus group meetings was recorded on videotape for later analysis, in addition to extensive written notes made by the first author. The videotapes were then reviewed and evaluated by all three authors. The researchers individually identified specific attributes brought up in the focus group sessions, then met together to examine each evaluator's classifications. Differences were discussed and resolved in these meetings. Appropriate attribute-related comments were highlighted and used to help develop the MEVHMs.

After the attribute meetings, each researcher, again, individually identified any values and benefits that the focus group participants brought up, discussed or suggested during the sessions. The process used to evaluate the attributes was repeated with benefits and then values. These findings were used to develop the three levels of value hierarchy models (individual-level, group-level and overall-level) that display the values that customers desire. The evaluators developed models for individual respondents, groups and DLA. Each author's models were then compared to determine one "overall" MEVHM for DLA.

Value hierarchy model of DLA customers

This process just described involved the development of an MEVHM for each individual in each focus group. From this base, an MEVHM was developed for

each focus group, aggregated across all the participants in that particular focus group. Finally, an MEVHM was developed for DLA overall by aggregating the results across all focus groups. Although a time-consuming and qualitative process, much useful information was obtained on the important attributes, benefits and desired values of DLA customers. The following examples present the results of the evaluators' meetings to compare and contrast the various attributes, benefits, values and models.

Means-end value
hierarchy model

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Individual-level example

Due to space restrictions, all of the individual's MEVHMs are not presented here. However, an example customer was chosen to demonstrate not only the process, but also to show the attributes, benefits and values important to an individual customer. This example is of a medical support person who provided exceptionally clear comments that could be applied to the model.

This person focused first on the traditional attributes of logistics: among others, timeliness and availability. His comments provided examples of these points as being important attributes:

- "If you are going to stock it, you've got to have it".
- "If they have the item, (then) turn around is fantastic".
- "Turn around time was unacceptable in a contingency (situation)".

These were points that helped to identify this person's attributes that were important. The first was availability as an important portion of DLA's service. The comments on turnaround time highlight the concept of timeliness as another attribute. These attributes formed the foundation of the benefits. The two attributes of timeliness and availability were components of the benefit termed, "delivery effectiveness". This term, among others, was used because of its use in industry and in the focus groups. The higher level terms must not only link together the attributes, but they must also be understandable to all involved companies.

Another benefit identified was "good communication". The ability to send and receive information was important to the user. His statements reflected the importance of being able to receive accurate information from DLA personnel:

- "[it was important to] tell me when they (DLA) are going to ship it".
- "[DLA] does not listen to their customers' needs".
- "[but, we are] pleased with DLA at the personal level".

Furthermore, he implied that a paradox existed. First, DLA as an organization was not listening to their customers. However, those customers were pleased with the individual they spoke with at DLA. Although there may not be a clear resolution to the conflict, it reinforces the importance of communication throughout DLA.

Finally, this individual's value was determined: quickly satisfying the customer's needs. The user stated that DLA, "planned in a vacuum". He had previously identified that DLA did not listen to their "customers' needs". These comments identified that the value the customer actually required from DLA was the fast fulfilment of requests. Figure 2 shows the model that resulted for this individual.

This model ties together the related attributes with their appropriate benefits or the main value of "quickly satisfying customer needs". One interesting point was that one individual's value or benefit may be another person's attribute. This aspect of qualitative research made agreement on various attributes, benefits and values very difficult. Managers attempting to apply this process will face difficulty in reaching consensus with their evaluators.

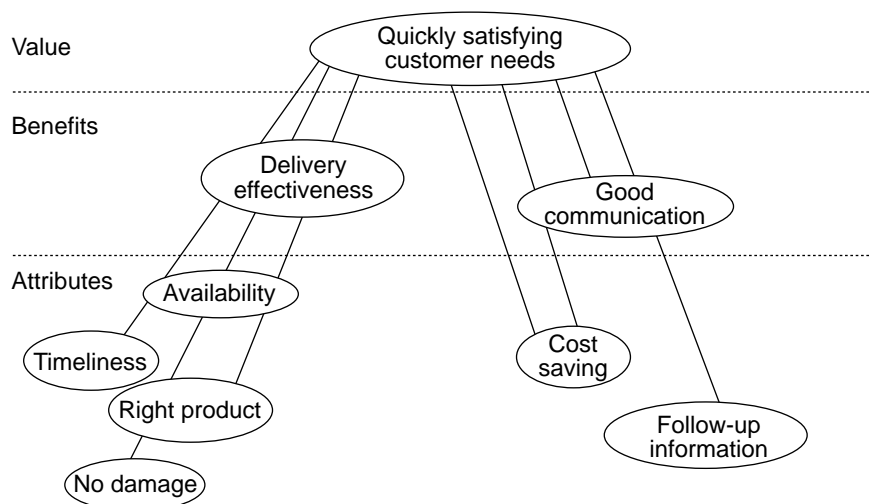


Figure 2.
Means-end value
hierarchy model for the
example customer

Group example

Building on the individual's model, the medical group was chosen to present an example of the next step in building a MEVHM for DLA. Other medical personnel's comments were included to provide a better understanding of important points to this group in aggregate.

The remainder of the group had identified two other areas that were important to the medical group: "cost" and "credibility". Various individual models included these attributes within their frameworks, with strong supporting comments:

- "Sometimes local purchases are cheaper."
- "[DLA would] blow out the budget."
- "DLA failed to act like a commercial vendor."

These quotes point to the cost of doing business with DLA. Also, the commercial vendor comment, when taken in context, identified that DLA failed to provide reliable service. This lowered the level of “trust” in DLA’s abilities.

The building of the medical group MEVHM included these additional attributes and benefits (Figure 3), which led to the overall group value of “responsibility to stakeholders”. The medical group identified itself as a stakeholder, but also implied the importance of other stakeholders – taxpayers and end-users. Two comments in particular support their value:

- “I deal with end users.”
- “They (DLA) don’t understand and sit there, do (*sic*) what they do best. They don’t understand nor do they try to get understanding of what’s going on in the world in what (*sic*) we are trying to support.”

Overall DLA MEVHM

The final step was to consolidate all of the groups’ data into the overall DLA MEVHM. Just as each group model was derived by bringing together the individual models, the overall model was created by aggregating the group models. This final step collected a broad range of attributes, benefits and values.

The goal of this model was to represent the general needs of all of DLA’s customers based on the customers interviewed in the focus groups. Figure 4 shows the consolidated MEVHM. Unfortunately, space limitations restrict the discussion to a few examples. However, every attribute, benefit and value had numerous example quotes.

It should not be surprising that many of the attributes were items associated with traditional logistics operations – after all, the DLA is a logistics

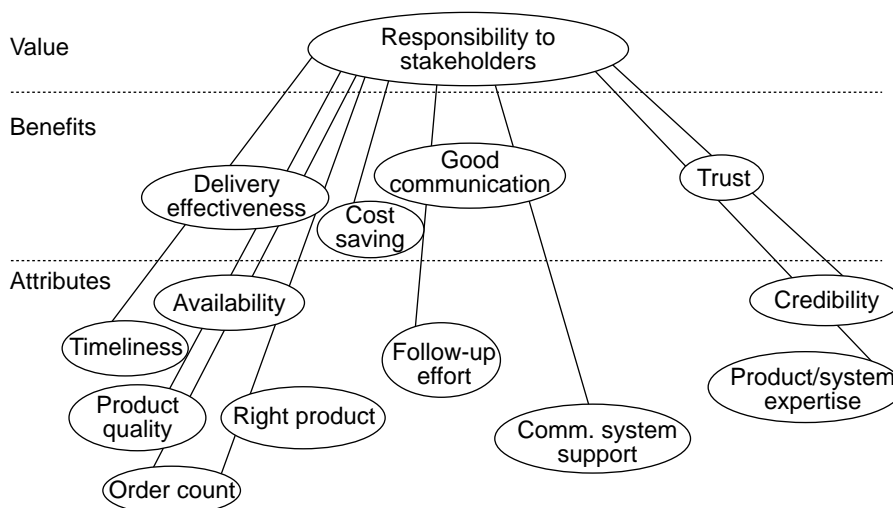


Figure 3. Means-end value hierarchy model for the example group

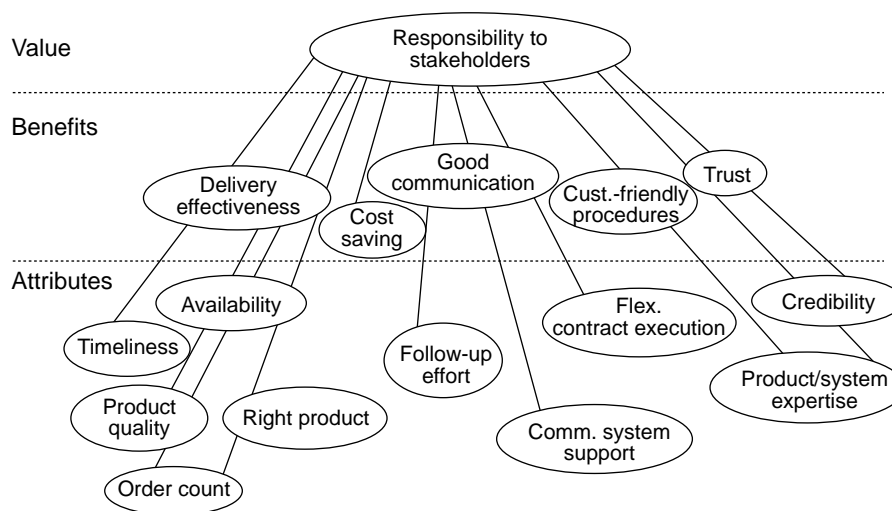


Figure 4.
Means-end value
hierarchy model for the
DLA customer

organization. The availability and timeliness attributes identified by the first individual were repeated by numerous individuals and groups. However, others were revealed with the combination of the various groups. These included follow-up effort and communication system support:

- “Once it goes out, they won’t talk to you.”
- “When their computer says it’s out, they say it’s on the way and they don’t know where.”
- “I haven’t heard any response for 4-5 months.”
- “Give us some feedback.”

These attributes tied into the good communication benefit. These attributes and benefits are not as traditional as some of the others. However, the importance of customer service and quality was consistent with the points made in the literature review. Finally, these attributes helped to support the overall values of DLA’s customers.

“Responsibility to stakeholders” was identified as the value for DLA’s customers, where stakeholders included operations personnel, support personnel, foreign buyers/government and tax payers. In other words, what DLA customers really wanted from DLA (what they valued) was support in serving their stakeholders – an understandable value in a channel setting.

Conclusions

Recent research in business settings has demonstrated that customers are not motivated strictly by the attributes of the products/services their suppliers offer (Anderson and Narus, 1995). Rather, they are motivated to the degree these

attributes result in benefits that lead to realization of what the customers value. This is as true of logistics services as any other business-to-business service. This process reduces the risk of companies emphasizing logistics attributes that might not be consistent with what customers really value. Such a scenario is a formula for loss of differential advantage in today's dynamic business environment.

Means-end value
hierarchy model

The method of MEVHM, a consumer behaviour model, has been presented as one way to understand this attributes-to-benefits-to-value customer logic. With such understanding comes information necessary for strategic and tactical logistics planning. For example, the DLA MEVHM in Figure 4 indicates the benefits which customers derive from DLA service and thus, the areas that should receive the most strategic attention from DLA. These strategic benefits lead to the attributes of logistical operations that should receive the most tactical attention from DLA. If, for example, trust was found to be a very important benefit provided, strategic directions would indicate a need to improve the credibility and perceived expertise of DLA personnel, not a need to improve the traditional logistics attributes of timeliness, availability, etc. Further, if the importance of benefits varied by product category or some other customer segment definition (branch of military service, for instance), a market segmentation approach might be taken, where different tactical logistics programmes are developed for each segment. This would allow DLA resources to be applied to the areas where they could do the most good. Thus, the MEVHM is a unique method that may provide the organization with strategic and tactical directions it had not previously even considered.

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A future research direction which derives from this discussion is how to determine which of the benefits revealed are the most important in satisfying the customer. A key question becomes how do they find out which of the benefits indicate the strategic direction logistics needs to pursue? The answer to this question probably lies in the rather extensive customer satisfaction literature, but one can envision a research process that starts with the MEVHM method and then uses existing customer satisfaction methodologies to determine which benefits are most important to customers or segments of customers. Results of this two-stage customer value research process would provide direction to management for strategic resource planning while reducing the limitations of purely qualitative research. However, the pursuit of this methodology, as it applies to logistics, is left to future research.

Future research issues aside, it is clear that logistics service providers can no longer be content with such attribute based measures as high order fill rates. Customers demand and value more from their suppliers. Although the MEVHM method is based in the consumer behaviour research, it helps to clarify not only the important logistics attributes, but also the underlying benefits and values that may be important to customers. The DLA example provides a process overview for managers to use as a basis for identifying what their customers truly want. We encourage the use of this methodology to identify more fully the differential advantages logistics service can provide.

References

- Ackerman, K.B. (1989), "Value-added warehousing cuts inventory costs", *Transportation & Distribution*, Vol. 30, July, pp. 32-5.
- Ackerman, K.B. (1991), "Debuzzing 'value-added'", *Transportation & Distribution*, Vol. 32, September, p. 60.
- Anderson, J. C. and Narus, J. A. (1995), "Capturing the value of supplementary services", *Harvard Business Review*, Vol. 73 No. 1, January-February, pp. 75-83.
- Bowersox, D.J., Mentzer, J.T. and Speh, T.W. (1995), "Logistics leverage", *Journal of Business Strategies*, Vol. 12, Spring, pp. 36-49.
- Calder, B. J. (1977), "Focus groups and the nature of qualitative marketing research", *Journal of Marketing Research*, Vol. 14, August, pp. 353-64.
- Coyle, J.J., Bardi, E.J. and Langley, C.J. Jr (1992), *The Management of Business Logistics*, Fifth Edition, West Publishing Co., St Paul, MN, pp. 38-9.
- Davis, F.W. Jr and Manrodt, K.B. (1991), "Principles of service response logistics", *Proceedings, Council of Logistics Management*, Chicago, IL, pp. 339-55.
- Davis, F.W. Jr and Manrodt, K.B. (1993), "The evolution to service response logistics", *International Journal of Physical Distribution & Logistics Management*, Vol. 22 No. 9, pp. 3-10.
- Foggin, J.H. (1991), "Closing the gaps in services marketing: designing to satisfy customer expectations", in Stahl, M.J. and Bounds, G.M. (Eds), *Competing Globally through Customer Value*, Quorum Books, New York, NY, pp. 510-30.
- Global Logistics Research Team (1995), *World Class Logistics: The Challenge of Managing Continuous Change*, Council of Logistics Management, Oak Brook, IL, pp. 183-215.
- Gordon, J. (1989), "A textbook case of adding value", *Distribution*, Vol. 88, August, pp. 103-5.
- Gutman, J. (1982), "A means-end chain model based on consumer categorization processes", *Journal of Marketing*, Vol. 46, Spring, pp. 60-72.
- La Londe, B.J. and Zinszer, P.H. (1976), *Customer Service: Meaning and Measurement*, National Council of Physical Distribution Management, Chicago, IL, pp.156-9.
- La Londe, B.J., Cooper, M.C. and Noordewier, T.G. (1988), *Customer Service: A Management Perspective*, Council of Logistics Management, Oak Brook, IL, pp. 5, 11-14.
- Lambert, D.M., Stock, J.R. and Sterling, J.U. (1990), "A gap analysis of buyer and seller perceptions of the importance of marketing mix attributes", *1990 AMA Educators' Proceedings*, American Marketing Association, Chicago, IL, p. 208.
- Langley, C.J. Jr and Holcomb, M. (1992), "Creating logistics customer value", *Journal of Business Logistics*, Vol. 13 No. 2, pp. 1-27.
- Mentzer, J.T. (1993), "Managing Channel Relations in the 21st Century", *Journal of Business Logistics*, Vol. 14 No. 1, pp. 27-42.
- Mentzer, J.T. and Firman, J. (1994), "Logistics control systems in the 21st Century", *Journal of Business Logistics*, Vol. 15 No. 1, pp. 215-28.
- Mentzer, J.T., Gomes, R. and Krapfel, R.E. Jr (1989), "Physical distribution service: a fundamental marketing concept", *Journal of The Academy of Marketing Science*, Vol. 17 No. 1, pp. 53-62.
- Novack, R.A., Langley, C.J. Jr and Rinehart, L.M. (1995), *Creating Logistics Value: Themes for the Future*, Council of Logistics Management, Oak Brook, IL, pp. 176-89.
- Parasuraman, A., Zeithaml, V. and Berry, L. (1985), "SERVQUAL: a conceptual model of service quality and its implication for future research", *Journal of Marketing*, Vol. 49, Fall, pp. 41-50.
- Perreault, W.D. Jr and Russ, F.A. (1974), "Physical distribution service: a neglected aspect of marketing management", *Michigan State University Business Topics*, Vol. 22, Summer, pp. 37-45.

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- Rinehart, L.M., Cooper, M.B. and Wagenheim, G.D. (1989), "Furthering the integration of marketing and logistics through customer service in the channel", *Journal of The Academy of Marketing Science*, Vol. 17 No.1, pp. 63-71.
- Shapiro, R.D. and Heskett, J.L. (1985), *Logistics Strategy: Cases and Concepts*, West Publishing Co., St Paul, MN.
- Stock, J.R. and Lambert, D.M. (1987), *Strategic Logistics Management*, 2nd edition, Dow-Jones Irwin, Homewood, IL, pp. 172-3.
- Witt, C.E. (1991), "Adding value accuracy equals quality", *Material Handling Engineering*, Vol. 46, April, p. 43.
- Woodruff, R.B. and Gardial, S. (1996), *Know Your Customer*, Blackwell Publishers, Cambridge, MA, pp. 54-63, 65, 69.
- Woodruff, R.B., Schumann, D.W. and Gardial, S.F. (1993), "Understanding value and customer satisfaction from the customer's point of view", *University of Tennessee Survey of Business*, Vol. 28, Summer/Fall, pp. 33-40.
- Zeithaml, V.A. (1988), "Consumer perceptions of price, quality and value: a means-end model and synthesis of evidence", *Journal of Marketing*, Vol. 52, July, pp. 2-22.