What is the right supply chain for warfare?
Learning from the success of Aldi, Dell and Zara
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Introduction
When the rules of the game change, how should business change? In the armed forces there are many developments leading to questions on how they should change. They come from inside as well as outside the military organization and they change the rules of the game. To mention just a few: (1) the development and implementation of powerful and affordable ICT, which can be used for controlling logistics; (2) the decreasing defense budgets, necessitating efficiency improvements; (3) the changing enemy characteristics and conflict situations, which decrease certainty about the enemy; (4) the emergence of a rising number of terrorist conflicts, which increases complexity and, finally, (5) Network Centric Warfare (NCW). The central idea of NCW can be described in terms efficient application of combat power (Faber, Jansen and Thoolen, 2003).

The developments in the armed forces prompt a great many research questions relating to enhancing operational success; for example: How to determine and ensure successful operations in circumstances of war? How should armed forces deal with the increasing trend of global terrorism, which decreases demand certainty? What are the consequences of NCW for operating in circumstances of war? How to respond to the changing enemy characteristics and conflict situations?

Just like the armed forces civil businesses are confronted with many internal and external developments, which change the rules of the game. Increasing prosperity, mass-customization, individualization, globalization, core business initiatives and available ICT technology (Vermunt and Binnekade, 2000) are just few of them. Companies like Aldi, Dell and Zara are remarkably successful in their market environments despite all developments, as their large and solid market position and high profits show. Research has shown that the starting point of their success lies in determining the optimal business positioning, based on choosing the right supply chain and logistic performance criteria, e.g. reliability, responsiveness and agility, based on internal and external business characteristics (Accenture, Stanford and INSEAD, 2003).

The relevance of this article lies in its analysis of successful companies in different market environments, and the lessons the armed forces can draw from their success stories. By being able to determine the optimal business positioning and thereby the right supply chain, they should understand how to improve their performance in warfare.
First, the business characteristics of Aldi, Dell and Zara are described and analyzed to determine the secret of their success. Secondly, the business characteristics of warfare (symmetric conflict, third party involvement and asymmetric conflict) will be described to identify any similarities and differences between armed forces and civil businesses. The final section of this contribution discusses the manner in which armed forces can learn from the success of Aldi, Dell and Zara in determining the optimal business positioning and therefore the right supply chain for warfare.

Business characteristics Aldi, Dell and Zara
In the following section business cases of Aldi, Dell and Zara are presented. They are used to define the main business characteristics for each company and clearly distinguish between them. Based on theories of Christopher (Aitken, Christopher and Towill 2002), Fisher (Fisher, 1997 and 1999) and Sheffi (Sheffi, 2001) seven business characteristics can be distinguished (see table 1):
- the market
- the marketing
- the products offering
- the product life cycle
- the demand certainty
- the relation focus
- the logistic performance criteria

Business characteristics Aldi

Aldi keeps it cheap so shoppers can too. So how has discount food retailer ALDI Group become one of the world’s biggest grocery chains, running 6,600 - plus stores worldwide? By offering deeply discounted prices on about 700 popular food items (a typical grocery store has 25,000). No frills ALDI (short for ‘Albrecht Discounts’) buys cheap land mostly on city outskirts, builds cheap warehouses, keeps a tiny staff, and carries mostly private-label items, displaying them on pallets rather than shelves. ALDI has more than 700 stores in 26 US states, but Germany (where ALDI has 40% share of the grocery market) accounts for about two-third of sales.

Source: www.hoovers.com/tree/co/factsheet.xhtml?COID=54910
Aldi is a discount food retailer which distinguishes itself mainly by focussing the logistic performance criteria purely on reliability (see table 4) in combination with a product-driven marketing; in other words the price/quality-driven marketing (Bolwijjn and Kumpe, 1990) (see table 1).

<table>
<thead>
<tr>
<th>Business characteristics</th>
<th>Aldi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market</td>
<td>Food retailer</td>
</tr>
<tr>
<td>Marketing</td>
<td>Product driven</td>
</tr>
<tr>
<td>Products offering</td>
<td>Mass-standardisation</td>
</tr>
<tr>
<td>Product life cycle</td>
<td>Long (years)</td>
</tr>
<tr>
<td>Demand certainty</td>
<td>High</td>
</tr>
<tr>
<td>Relation focus</td>
<td>Individual actors</td>
</tr>
<tr>
<td>Logistic performance criteria</td>
<td>Reliability</td>
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</tbody>
</table>

Table 1: Business characteristics Aldi

Ultimately this leads to the lowest discounted prices and that is what Aldi’s customers, who primarily focus on product price instead of product name branding, come for. Aldi is the brand name and it stands for quality. That is why Aldi can offer private-label products in pallets or sometimes on shelves.

The small assortments of products Aldi offers to customer have long product life cycles, high demand certainty, high throughput and they are produced in mass-standardization methods. This implies that Aldi’s products can be bought relatively easily and cheaply by many suppliers. The time-to-market is therefore long but acceptable. Another business characteristic is the low level of collaboration Aldi initiates. It focuses its relations on individual actors (see table 5) instead of collaboration in chains or networks (Vermunt and Binnekade, 2000). This is because in the market in which they perform the need for strong partnerships is relatively low because of the high demand certainty and the mass-standardized products offering with long product life cycles.

Business characteristics Dell

Dell
Business to Consumer (B2C)
Corporate innovators typically design supply chains that anticipate and respond to the changing demands of their customers; their supply chain strategies are tightly linked to their account and channel strategies. Customers get exactly what they
want, with no more cost or complexity added to the seller’s operations. This is mass customization combined with mass-market simplicity.

Technology greatly enables mass customization. For example, Dell has completely automated its ability to take thousands of orders, translate them into millions of component requirements, and work directly with its suppliers to build and deliver products to meet individual customer requirements. In fact, more than 90 percent of Dell’s component purchases now are handled online: Suppliers use an Internet portal to view Dell’s requirements and changes to forecasts based on marketplace activity, and to confirm their ability to meet Dell’s delivery requirements. Then, as Dell factories receive orders and schedule assemblies, a “pull” signal to the supplier triggers the shipment of only the materials required to build current orders. Dell also provides its customers with accurate delivery dates by using available-to-promise technologies.


Dell
Business to Business (B2B)
Following Dell’s lead, almost every major IT vendor has changed its strategy to accommodate the move toward industry-standard technology. Dell has built its strategy around standardization in the data center from day one, and is poised to deliver the best value in a post-inflection point world by realizing its vision of scalable enterprise computing.

Scalable enterprise computing represents a transparent array of standards-based systems - servers, switches, storage networks, etc. - that are tied together and serve as a true dynamic resource.

Dell is committed to advancing standards-based computing and driving down the cost of enterprise technology. Compelling performance, lower costs and more open computing environments enable enterprises to grow confidently without limiting their options or compromising mission-critical applications.


Dell is one of the world’s leading direct computer systems companies in the Business to Consumer (B2C) and a major supplier of technology for the internet infrastructure in the Business to Business (B2B) (see table 2).
Characteristic for Dell is its widely known efficient build-to-order business model: mass-customization combined with mass-market simplicity in the B2C market. This mass-customization leads to a segment-driven marketing (Bolwijn and Kumpe, 1990), in other words the product-market-driven marketing based on target groups. The customer in the B2C market is offered a great variety of components, which can be build-to-order (customized) in short time-to-market. The responsiveness, based on mass-customization, is segmented (see table 4). The demand certainty of the customized product can be called medium because the great variety of components is relatively certain. However, the demand certainty of the unlimited possibilities of the specific end products is relatively low. To deal with this medium demand certainty, Dell collaborates in Demand supply chains (see table 5), which are rather static (Jansen, Faber and Thoelen, 2003) but applicable to the mass-customization focus in Dell’s B2C case because of the medium demand certainty of the components.

In the B2B market, Dell’s marketing is individualized-driven because the individual customer’s requirements are taken into account. Dell uses mass-individualization product offering methods to decrease costs by offering the customer an individualized product based on standard processes. The product life cycle in the B2B markets is low and characterized by low demand certainty. To deal with this low demand certainty, Dell collaborates in demand networks (see table 5) and focuses on individualized responsiveness (see table 4).
Zara's marketing strategy focuses on product variety, speed-to-market, and store location. It is also notable for what it excludes. Zara does not advertise in the traditional sense. If you want to find out what's currently available at the Zara stores you have two options: go to the web site or go to the store. Zara puts 10,000 different items on the store selves in a single year. It can take a new style from concept to store shelf in 10-14 days in an industry where nine months is the norm. In its primary European markets, Zara locates its stores close together.

Zara's Toronto store is located just north of the center of downtown in a major shopping district dense with malls and lined with stand-alone stores and giant office buildings. The potential for intense competition is clear. "These office buildings are full of the people we want as customers. We want them to stop in at lunch or after work. Because the stock changes often, with most items staying on the shelf for only a month, customer often finds something new and appealing."

"We receive shipments on Tuesday and Saturday, which means that we have different items in the store at least twice a week. While each shipment replenishes items that sell well, each also includes new items. That's why our customers come in often" the Toronto store manager said. "We might get ten of one item and five of another. We're constantly testing."

Zara manufactures 80% of its clothing in Europe, while most of the remaining 20% is sourced in Mexico.

Source: CLM, CLM Tool Box, 2002, p. 46-47

Zara distinguishes itself in the fashion industry by a minimal time-to-market (see table 3). In 10 to 14 days a new style can be on the store shelf, whereas the competition takes 20 times longer to introduce a new style on the store shelf.
Apart from that, every 6 weeks there is always a new fashion collection available in all stores, based on the latest fashion trends. There are 315 stores (519 Zara) in 40 countries. Zara’s marketing is innovation-driven (Bolwijn and Kumpe, 1990) to have trendy fashion in the stores with a very short time-to-market. The short time-to-market indicates time compression, which is the heart of agile (see table 4) strategies (Christopher, 2004). The short product life-cycle of the fashion characterized by an uncertain demand increases the need for agility (Aitken, Christopher and Towill, 2002). Agile networks (see table 5) create high measures of resilience, by selecting partners based on their process functionalities, to create velocity and visibility. Zara can be agile by selecting manufacturers and designers based on their process functionalities (the manufacturing asset capabilities).

Zara’s marketing is innovation driven and because the trendy fashion is designed for a number of customers instead of an individualized customer, Zara’s products are called mass-innovation.

Analyzing business characteristics of Aldi, Dell and Zara in relation to their success After determining the business characteristics of Aldi, Dell and Zara, it is interesting to know why they make these companies successful in their markets. In order to do so, the business characteristics are related to the business positioning. The optimal business positioning is determined by choosing the right supply chain and logistic performance criteria, e.g. reliability, responsiveness and agility, based on internal and external business characteristics (see figure 1). If the business positioning is ‘optimal’ there is a match (Fisher, 1997), if it is not optimal, there is a mismatch, which implies inefficiency and ineffectiveness (Waddington, Childerhouse and Towill, 2002). There are four optimal business positionings: Mass-standardization, Mass-customization, Mass-individualization and Mass-innovation (see table 6).
For the internal business characteristic the logistic performance criteria are chosen, and they describe the internal focus based on the product life cycle and the demand certainty of the market. This can vary from reliability, segmented responsiveness, and individualized responsiveness to agility (see table 4), based on an increasing need for individual customer service.
Table 4: Definitions Logistic performance criteria

<table>
<thead>
<tr>
<th>Logistic performance criteria</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>Reliability indicates responding by delivering products or services in the right time, place, condition and quantity.</td>
</tr>
<tr>
<td>Segmented responsiveness</td>
<td>Segmented responsiveness indicates responding to the demand of a target group, based on standard components or modules to create logistic synergy.</td>
</tr>
<tr>
<td>Individualized responsiveness</td>
<td>Individualized responsiveness indicates responding to standard individual customer requirements, based on standard processes or activities to create logistic synergy.</td>
</tr>
<tr>
<td>Agility</td>
<td>Agility indicates responding to innovative individual customer requirements, based on standard process functionalities and procedures to create logistic synergy.</td>
</tr>
</tbody>
</table>

Table 5: Definitions relation focus

<table>
<thead>
<tr>
<th>Relation focus</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual actors</td>
<td>Companies which focus on internal integration.</td>
</tr>
<tr>
<td>Demand supply chains</td>
<td>Companies which collaborate in demand supply chains to respond to the need of segmented responsiveness, based on fixed partnerships, to create external (chain) integration.</td>
</tr>
<tr>
<td>Demand network</td>
<td>Companies which collaborate in a network to respond to the need of individualized responsiveness, based on a limited number of selected identical suppliers and manufacturers, used to respond to the standard individual customer requirements.</td>
</tr>
<tr>
<td>Agile network</td>
<td>Companies which collaborate in a network to respond to the need of agility, based on a community of suppliers and manufacturers, who share business standards, used to respond to the innovative individual customer requirements.</td>
</tr>
</tbody>
</table>

For the external business characteristic the 'relation focus' is chosen. Relations are determined by the logistic design, the measure of collaboration, integration and information sharing in the business. The relation focuses are: Individual actor, Demand supply chain, Demand network and Agile network (see table 5).

The combination of the internal and external business characteristics, the logistic
performance criteria and the relation focus, indicates a match or a mismatch. A match implies the optimal business positioning, the starting point for success, because of the absence of inefficiency and ineffectiveness. Based on the theory of Van Asseldonk (2000) and Bolwijn & Kumpe (1990) four matches or optimal business positionings are distinguished: Mass-standardization, Mass-customization, Mass-individualization and Mass-innovation (see table 6).

<table>
<thead>
<tr>
<th>Relation focus</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass-standardization</td>
<td>Mass-standardization focuses market supply on price and quality and creates retention by keeping stock of end products.</td>
</tr>
<tr>
<td>Mass-customization</td>
<td>Mass-customization focuses market demands on price, quality and choice and creates retention by keeping stock of product components.</td>
</tr>
<tr>
<td>Mass-individualization</td>
<td>Mass-individualization focuses market demands on price, quality, choice and individuality and creates retention by selecting fixed suppliers in a demand supply chain based on available process capacity.</td>
</tr>
<tr>
<td>Mass-innovation</td>
<td>Mass-innovation focuses market supply on price, quality, choice, individuality and innovation and creates retention by selecting variable suppliers in a community based on process functionalities.</td>
</tr>
</tbody>
</table>

Table 6: Definitions optimal business positioning

If the optimal business positioning is the starting point for success, it is interesting to see how Aldi, Dell and Zara businesses are positioned. When the business characteristics of Aldi, Dell and Zara (see table 1, 2 and 3) are projected into the business positioning (see figure 1), the following results become visible (see figure 2):
Aldi focuses on mass-standardization, Dell’s - B2C on mass-customization, Dell’s - B2B on mass-individualization and Zara on mass-innovation, based on the data in table 1, 2 and 3. In conclusion it can be said that all three companies match an optimal business positioning, which indicates an absence of inefficiency and ineffectiveness. Realizing the optimal business positioning, according to the internal and external business characteristics, can be assumed to be the secret of their success.

If the armed forces or other civil businesses want to learn from Aldi’s, Dell’s and Zara’s success, the advice is to consider their specific business positioning and determine whether this is a match (optimal) or a mismatch. If it is found to be the latter, the company should determine in what direction to go to in order to realize a match. It is possible to accept a mismatch but the company has to realize why it does so. For example, a company, which has just started in a new market, can accept inefficiency (mismatch) caused mainly by the low demand certainty of the market environment and the early product life cycle stage, in order to create higher customer service levels than necessary to ensure a market for the product. In time the company has to realize when to focus on a match or why they refrain from doing so. In the following section the armed forces are positioned in figure 1 to determine their business positioning and the ensuing right supply chain and logistic criteria in warfare.
Business characteristics military forces in warfare

Armed forces have to deal with internal and external developments that bring along many challenges for the operational logistics and the home base logistics. Home base logistics mainly focuses on production, purchasing, keeping stock and maintenance. Operational logistics, on the contrary, mainly focuses on the combat service support in war operations. For the operational logistics the increase in global terrorism brings along problems such as: What is the right supply chain and what are the logistic criteria in warfare, depending on whether the enemy uncertainty is or low or high?

It is important to understand that armed forces have to realize a high measure of readiness at all times, to deploy troops and deliver combat power in warfare based on different enemy characteristics (see figure 3).

Figure 3: Warfare characteristics of symmetric and asymmetric conflicts and third party involvement (Based on Faber, Jansen and Thoolen, 2003)

The Royal Netherlands Army defined three types of warfare (Royal Netherlands Army, 1999):

1. Symmetric conflict
Symmetric conflicts are based on warfare of one regular modern army and another regular modern, well-trained and mechanized, army, e.g. WW I & II.

2. Third-party involvement
Third-party involvement is based on deployment of multinational troops in a role of an interposition force or in situations where parties are more or less operating
next to each other. Third-party involvement starts with mutual agreement of the different parties in the area. Peace enforcing is therefore not the main task in Third-party involvement. In situations where peace enforcing becomes the main task Third-party involvement develops into symmetric or asymmetric conflict, depending on the characteristics, e.g. SFOR 14 in Bosnia.

3. Asymmetric conflict
Asymmetric conflicts are based on warfare of one modern army against a technologically obsolete army with fewer reserves, or warfare against an organization which does not represent any nation, or is not structured like most western armies, e.g. the Vietnam War.

The three types of warfare are distinguished on the basis of enemy characteristics and the relation focus (see table 7). The enemy characteristics are based on demand certainty, indicating the necessary logistic performance criteria, such as reliability, segmented responsiveness, individualized responsiveness, and agility.

<table>
<thead>
<tr>
<th>/ Type of warfare</th>
<th>Symmetric conflict</th>
<th>Third-party involvement</th>
<th>Asymmetric conflict</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business characteristics</td>
<td>Demand certainty</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Relation focus</td>
<td>Demand supply chain</td>
<td>Demand network</td>
<td>Agile network</td>
</tr>
<tr>
<td>Logistic performance criteria</td>
<td>Segmented responsiveness</td>
<td>Individualised responsiveness</td>
<td>Agility</td>
</tr>
</tbody>
</table>

Table 7: Military characteristics of the three types of warfare

Symmetric conflict
In symmetric conflicts the enemy makes concentrated attacks based on a relatively high demand certainty (in time, place and intensity), which makes it possible to design the relations based on demand supply chains. In these demand supply chains, which are rather static, the armed forces collaborate with fixed partners to ensure segmented responsiveness. This concept indicates responding based on standard modules, adjusted to target groups. This adjusting to target groups is possible because of the high demand certainty. Target group services are taken into account here.

Third-party involvement
In third-party involvement the relations focus lies with demand networks. They realize
the necessary measure of flexibility to ensure the individualized task in low demand certainty situations. To respond to low demand certainty, individualized responsiveness is necessary because there are no target groups to focus on and therefore focusing on the individual customer requirements is necessary. Individualized responsiveness indicates therefore responding based on standard procedures, to create logistic synergy, but the individual customer requirements are taken into account, for example, in the finishing touch. Flexibility and individual customer service are taken into account here.

Asymmetric conflict
In asymmetric conflicts the enemy makes spread out attacks based on total demand uncertainty. Demand networks are not flexible enough to respond to the changes in asymmetric conflicts. Because agility promotes adaptability, flexibility, and the ability to react quickly to changes in the market (Grabowski and Roberts, 1999), logistic support should focus on agile networks instead of demand networks. Just like demand networks, agile networks can consist of permanent or ad hoc collaboration possibilities: Joint, Combined or Civil Military Co-operations (CIMIC), which can help mitigate risk in the network (Christopher, 2004).

Optimal business positioning in warfare
The business positioning of armed forces at war has similarities to and differences with civil businesses. The main similarity is the fact that they both want to focus on an optimal business positioning to maximize the ratio between effectiveness and efficiency. However, in war operations effectiveness has priority over efficiency when a disruption (e.g. terrorist attack) takes place (Sheffi, Rice, Fleck and Caniato, 2003). In case of such a disruption the optimal business positioning will no longer be leading in war operations.

In figure 4 the optimal business positioning for operating in circumstances of war is determined, based on the contents of table 6. Added to this figure are the home base logistic operations to indicate the difference with the war operations. Home base operations primarily focus on reliability, based on a very high demand certainty, and their relations are individual companies. This is in fact the internal integration of the Netherlands armed forces.
This results in the following optimal business positioning:

- In home base operations the optimal business positioning is: mass-standardization,
- In symmetric conflicts the optimal business positioning is: mass-customization,
- In third-party involvement the optimal business positioning is: mass-individualization
- In asymmetric conflicts the optimal business positioning is: mass-innovation.

All three conflicts can be positioned in an optimal business positioning, indicating that the most successful operating method, based on having no inefficiency and ineffectiveness, is different for each type of warfare. Still, it remains to be seen whether or how armed forces differentiate their policy according to the type of war operation.

The success of Aldi, Dell and Zara is based on the fact that the company policy strictly focuses on the only optimal business positioning. If the armed forces’ policy deviates in war operations from the optimal business positioning, to increase the effectiveness in case of a disruption, this policy brings along many questions, such as:

- How much effectiveness should be realized in what type of warfare?
- How should the norm of effectiveness for operating in circumstances of war be defined?
- What is the priority in case of a disruption in home base operations: optimal business positioning, effectiveness or efficiency?
Fisher (Fisher, 1997) determined that a company can have more than one relation focus (collaboration level). Keeping this in mind, together with the optimal business positioning, it can be concluded that military forces should also focus on more than one business position, if one or more war operations are assigned to them apart from the always existing home base operations. So how does military policy make possible more than one business positioning?

Many questions arise when armed forces want to learn from successful civil companies. The indication of the business positioning of military policy nowadays (see figure 5) is mainly a mismatch.

Agility promotes adaptability, flexibility, and creates the ability to react quickly to an enemy attack in warfare. In asymmetric conflicts this is the right starting point, however for highly certain war operations this increases inefficiency.

It is relevant to understand why military policy sometimes deviates from the optimal business positioning. Policy makers should have the capability to determine the right supply chain match (relation focus), so future improvements can be initiated. Without understanding what the consequences of a mismatch are, business positioning improvements are far away.

Figure 5: Military policy versus war operations.
Lesson learned
In this study we developed a new theoretical framework, that explains the success of companies like Aldi, Dell and Zara, based on four types of optimal business positioning (see Figure 1): (1) mass-standardization, (2) mass-customization, (3) mass-individualization, and (4) mass-innovation. These four have their ‘right supply chain’ which matches ‘the logistic performance criteria’, indicating minimal inefficiency and ineffectiveness. This is why some businesses perform successfully in their markets!

Similarly, armed forces see such a match in warfare as a sign of minimized inefficiency – an important requirement in times of decreasing military budgets and the increased pressure from the government’s audit office, which may point at the organization’s inefficiency –, and ineffectiveness – because of the increasing need for responsiveness and agility. This match should be developed in a military-oriented theoretical framework for the three types of warfare: (1) the symmetric conflict, (2) the third party involvement, and (4) the asymmetric conflict, to create a military-oriented theoretical framework. From studying the civil business successes the following military oriented framework was developed:

(1) symmetric conflicts matches mass-customization,
(2) third party involvement matches mass-individualization, and
(3) asymmetric conflicts matched mass-innovation.

Current projects of the Royal Netherlands Army, such as Physical Distribution 2006 (FD 2006) and the Operational Logistic Concept 2006 (OLC 2006), initiate an increasing level of awareness to improve efficiency, based on an increasing level of collaboration. Although this project is an improvement, all these projects are based on one type of supply chain, which should be adjusted to the specific war type. If armed forces remain focussed on only one supply chain, they can only create a match in symmetric conflicts. In third-party involvement and asymmetric conflicts, the measure of flexibility, responsiveness and agility will always be insufficient because of the mismatch, and therefore create ineffectiveness and inefficiency.

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